Carleton University

T. Sylvester (handwritten signature)

1968|1969

Main Court, Rideau River Campus

Carleton University

Twenty-seventh Annual Calendar for the academic year 1968-69

Rideau River Campus
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Telephone: 231-2620

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General Regulations:

General Regulations for Honours Degrees:

Details of Courses Offered:

Student Activities and Services

The Academic Year

November 11	Remembrance Day. Morning classes cancelled for one hour.
December 10	Last day of classes in first term, day and evening.
December 11-21	Mid-year examinations including Engineering half-course final examinations.
December 22-January 2	Christmas Holidays.

1969

January 3, 4	Half-course final examinations.
January 6	Second term begins in day and evening divisions.
January 31	Last day for receiving applications for degrees from potential spring graduates.
February 14	Last day for formal withdrawal from courses.
	Last day for applications for supplemental and special examinations in half-course final examinations.
February 24-March 1	Study period.
February 28-March 1	Half-course supplemental examinations.
April 4, 5, 6	Easter weekend. University closed.
April 11	Last day of classes in second term, day and evening divisions.
April 15	Last day for submission of theses in the Faculty of Graduate Studies.
April 18	Last day for handing in term assignments.
April 21	Final examinations begin in day and evening divisions.

Summer Session 1969

May 19	Statutory Holiday. University closed.
May 21, 22	Registration for evening classes, Summer School, 2-4 p.m., 7-9 p.m.
May 26	Summer School evening classes begin.
	Spring Convocation for the conferring of degrees. (to be announced)

Calendar of Milestones

The Institution

1942	Ottawa Association for the Advancement of Learning established to develop Carleton College. At first the College offered only evening classes in introductory university subjects, with some courses in Public Administration.
1943	Ottawa Association for the Advancement of Learning incorporated.
1945	Beginning of day classes and full-time teaching. Establishment of the Faculty of Arts and Science, including courses in Journalism, and first year Engineering.
1946	Move from rented premises to the First Avenue campus, formerly Ottawa Ladies' College. First degrees awarded in Journalism and Public Administration.
1947	The College committed itself to complete pass and honours courses, the third year of the program being offered for the first time in 1947-48, the fourth year in 1948-49, and the fifth (honours) year in 1949-50.
1949	First degrees in Arts, Science, and Commerce awarded. Formation of Senate.
1950	First honours degrees in Arts and Science awarded.
1952	The Carleton College Act 1952 passed by the Ontario Legislature. This changed the corporate name to Carleton College. It also confirmed the power to grant degrees.
1952-53	Property for new campus acquired.
1953	Establishment of the School of Public Administration.
1954	Appointment of Architectural Associates for Carleton to prepare first master plan and to design first group of buildings. First honorary degree of LL.D. conferred on Dag Hammarskjold, Secretary-General of the United Nations.
1955	First Master's degree awarded.
1957	The Carleton University Act, 1957. Establishment of the School of Engineering. Establishment of the Institute of Canadian Studies.
1959	Move to Rideau River campus, following construction of the Henry Marshall Tory Building (science), the Maxwell MacOdrum Library, and the Norman Paterson Hall (arts).

| 1961 | First degrees in Engineering awarded. |
| | First Ph.D. degree awarded. |

| 1962 | Southam Hall, the University Commons, Renfrew House (women's residence) and Lanark House (men's residence) completed. Paterson Hall extended and University Union opened. |

| 1963 | Reorganization into Faculties of Arts, Engineering, Science, and Graduate Studies. Three-storey extension to MacOdrum Library completed. |

| 1964 | The C. J. Mackenzie Building (engineering) completed. |

| 1965 | The E. W. R. Steacie Building (chemistry) completed. Grenville House and Russell House (men's residences) completed. Maintenance Building and Heating Plant completed. |

1966	The Physics Building completed. First extension to the C. J. Mackenzie Building completed. Two-storey extension to Southam Hall completed.
	Establishment of the School of International Affairs.
	Establishment of the School of Commerce.

| 1967 | Loeb Building (social sciences) completed. |
| | Integration of St. Patrick's College as a division of the Faculty of Arts, and of the School of Social Work on the St. Patrick's campus. |

| 1968 | Establishment of the School of Architecture. Second extension to the C. J. Mackenzie Building completed. |

Presidents

1942-1947	Henry Marshall Tory.
1947-1955	Murdoch Maxwell MacOdrum.
1955-1956	James Alexander Gibson (acting).
1956-1958	Claude Thomas Bissell.
1958-	Arnold Davidson Dunton.

Chancellors

| 1952-54 | Harry Stevenson Southam. |
| 1954- | Chalmers Jack Mackenzie. |

Enrolment

In the winter session 1967-68 there were 5,167 full-time students registered at the University: 4,255 on the Rideau River campus, and 912 on the St. Patrick's campus. There were 3,497 part-time students taking degree credit courses on the two campuses.

Chancellor	Chalmers Jack Mackenzie, C.C., C.M.G., M.C., D.SC., D.ENG., LL.D., D.C.L., F.R.S.
President and Vice-Chancellor	Davidson Dunton, LL.D., D.SC.
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The President and Vice-Chancellor

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Caryll Wells, M.A. Maryland,
Assistant Professor of Sociology, St. Patrick's College
Roger B. Wells, B.A. Reed, M.A., PH.D. North Carolina,
Assistant Professor of Psychology
Michael Welsh, B.A. Rhodes and Capetown, PH.D. London,
Assistant Professor of Classics
Russell Allan Wendt, M.A. Alberta,
Professor of Psychology
James C. S. Wernham, M.A. Aberdeen and Cambridge, S.T.M. Union,
Professor of Philosophy
M. S. Whittington, M.A. Carleton,
Assistant Professor of Political Science
Donald R. Whyte, B.SC. Manitoba, M.SC., PH.D. Cornell,
Associate Professor of Sociology
Frank Wightman, B.SC., PH.D. Leeds,
Professor of Biology (Botany)
R. H. Wightman, B.SC., PH.D. New Brunswick,
Assistant Professor of Chemistry
James M. Wilcox, B.S., M.A. Michigan,
Assistant Professor of English
D. R. Wiles, B.SC. Mount Allison, M.SC. McMaster, PH.D. M.I.T., F.C.I.C.,
Associate Professor of Chemistry
Thomas P. Wilkinson, B.SC. Durham,
Assistant Professor of Geography
Cyril G. Williams, B.A., B.D., M.A. Wales,
Associate Professor of Religion
Kenneth Stuart Williams, B.SC., Birmingham, M.A., PH.D. Toronto,
Associate Professor of Mathematics
N. M. Willis, B.A. Cambridge, M.A. Toronto,
Assistant Professor of History
A. M. Willms, B.A., B.ED. Alberta, M.A. Toronto and Carleton,
Associate Professor of Political Science
Phyllis Wilson, B.A. Queen's,
Assistant Professor of Journalism
Julian Wolfe, B.A. Carleton,
Assistant Professor of Philosophy, St. Patrick's College
Gordon James Wood, M.A. Toronto,
Associate Professor of English

Whitman Wright, B.A.SC. Toronto, M.SC., PH.D. Illinois,
Associate Professor of Engineering
D. J. Wurtele, B.A. London, M.A., PH.D. McGill,
Assistant Professor of English
H. Yamazaki, M.S. Hokkaido, PH.D. Wisconsin,
Assistant Professor of Biology
Raymond W. Yole, B.SC. New Brunswick, M.A. Johns Hopkins, PH.D. British Columbia,
Associate Professor of Geology
Lorna D. Young, B.A. Carleton, M.A. Rochester, PH.D. Dublin,
Assistant Professor of English (on leave of absence, 1968-69)
Graham Zelmer, B.SC. Manitoba,
Assistant Professor of Mathematics
Donald W. Zimmerman, A.B. Indiana, M.A., PH.D. Illinois,
Associate Professor of Psychology
Professors, Emeriti
Wilfrid Eggleston, M.B.E., B.A. Queen's, LL.D. Carleton, D.LIT. Western Ontario, F.A.G.S.,
Journalism
Stanley G. Tackaberry, C.B.E., B.A.SC. Toronto,
Engineering

Sessional Lecturers, Instructors, Demonstrators, and others
R. Aksim, B.A. Western Ontario,
Sessional Lecturer in German*
W. Amtmann, MUS. BAC. Toronto, M.MUS. Rochester, MUS.D. Strasbourg,
Sessional Lecturer in Music*
Hari S. Anand, B.SC. Punjab, M.SC. McGill,
Sessional Lecturer in Geography*
Norman A. Anderson, B.A. Principia, M.A. California, PH.D. Wisconsin,
Sessional Lecturer in English*
Elizabeth M. Arnason, M.S. Purdue, PH.D. Illinois,
Sessional Lecturer in Biology*
Hal Anthony,
Seminar Leader in Journalism*
A. J. Baer, D.SC. Neuchatel,
Sessional Lecturer in Geology*
R. A. Beebe, B.SC. Amherst, PH.D. Princeton,
Visiting Professor of Chemistry*
A. Bégin, B.A. Ottawa and Carleton, B.SC. Ottawa,
Sessional Lecturer in Spanish*
R. T. Begley, B.SC. Carleton,
Senior Demonstrator in Chemistry*
G. Belkov, M.A. British Columbia,
Sessional Lecturer in Russian*
Clifford S. Berschneider, B.A. Duquesne, M.A. Pittsburgh,
Sessional Lecturer in History*
Robert L. Borden, M.SC. Alberta, M.B.A. Western Ontario, P.ENG.,
Sessional Lecturer in Geology*
Jaroslav A. Boucek, B.A. Sir George Williams, M.A. Montreal, PH.D. Ottawa,
Sessional Lecturer in History*
B. A. Bowen, M.SC. Queen's, PH.D. Syracuse,
Sessional Lecturer in Engineering*

*Part time

R. W. Boyle, M.A.SC., PH.D. Toronto, F.R.S.C.,
Special Lecturer in Geology*
Paul Bravo, B.SC. Purdue,
Sessional Lecturer in Spanish*
J. Bruhwiler, B.A. Carleton, PH.D. Cincinnati,
Sessional Lecturer in German*
A. Buckley, M.SC. Alberta,
Demonstrator in Physics*
Brenda Burke, B.A. Carleton,
Sessional Lecturer in French*
Elizabeth Butterill, B.A. Western Ontario,
Senior Demonstrator in Physics*
June Byrne, B.A. Toronto,
Senior Demonstrator in Chemistry*
G. Cameron, M.A. McMaster,
Demonstrator in Physics*
Gordon D. Campbell, B.SC. Manitoba, M.S.C.E., PH.D. Purdue,
Sessional Lecturer in Engineering*
D. M. Caughey, B.SC. New Brunswick, D.I.C., PH.D. London,
Sessional Lecturer in Engineering*
Marcus S. Chappell, B.A.SC. British Columbia,
Sessional Lecturer in Engineering*
E. Chung, B.SC. Tunghai,
Demonstrator in Physics*
José C. Claros, DR. EN CIENCIAS ECON. Madrid,
Sessional Lecturer in Spanish*
E. P. Cockshutt, B.A.SC. Toronto, S.M., MECH.ENG., SC.D. M.I.T.,
Sessional Lecturer in Engineering*
M. Coulombe, B.A. Ottawa,
Sessional Lecturer in French*
J. L. Craft, B.SC. Sulross, M.SC. Syracuse,
Chief Demonstrator in Geology*
A. Dabezies, D. ès L. Paris,
Sessional Lecturer in French*
L. Cohen Van Delft, L. ès L. Aix, D.E.S. Paris, Agrégé des lettres modernes Paris
Sessional Lecturer in French*
P. Demers, B.A. Carleton,
Sessional Lecturer in French*
Richard J. Diubaldo, M.A. McMaster,
Sessional Lecturer in History*
R. H. Dowdell, B.A. Western Ontario, M.A. Carleton
Sessional Lecturer in Political Science*
Nathan Dreskin,
Seminar Leader in Journalism*
William Drinkwater, B.J. Carleton,
Special Lecturer in Journalism*
J. M. Duciaume, B.A. Ottawa,
Sessional Lecturer in French*
E. H. Dudgeon, M.A.SC. Toronto,
Sessional Lecturer in Engineering*
J. Dunsmoor, M.SC. Alberta,
Demonstrator in Physics*

*Part time

Simon L. Eckstein, B.A., B.R.E. Yeshiva, M.A. New York,
Sessional Lecturer in Religion*
S. Elliott, B.A. Wales, M.A. Nottingham,
Sessional Lecturer in Economics*
R. T. Elworthy, M.B.E., B.SC., PH.D. London,
Senior Demonstrator in Chemistry*
Thomas Farley, M.A. Carleton,
Sessional Lecturer in English*
P. J. Faulkner, B. COM. St. Patrick's, M.B.A. Michigan State, C.G.A.,
Sessional Lecturer in Accounting*
L. A. Finn, B.A. Ottawa, B.PAED. Montreal,
Sessional Lecturer in French*
Mary-Lou E. Florian, B.A. British Columbia, M.A. Texas,
Demonstrator in Biology*
Eugene A. Forsey, M.A. McGill and Oxford, PH.D. McGill, LL.D. New Brunswick,
Visiting Professor of Political Science*
J. Fouchier, D.O.P. Paris,
Sessional Lecturer in French*
Jean-Louis Gagnon,
Seminar Leader in Journalism*
T. W. Garrett, M.A.SC. British Columbia, PH.D. Cambridge,
Sessional Lecturer in Engineering*
D. Gill, B.SC. St. Patrick's, M.SC. Carleton,
Instructor in Physics*
Michael Gnarowski, B.A. McGill, M.A. Montreal,
Sessional Lecturer in English*
G. W. Goodkey, B.A.SC. Toronto,
Sessional Lecturer in Engineering*
Donald J. Goodspeed, B.A. Queen's,
Sessional Lecturer in History*
Donald G. Gould, M.A.SC., PH.D. Toronto,
Sessional Lecturer in Engineering*
Lynn Grey, M.A. Queen's,
Demonstrator in Biology*
Foster J. K. Griezic, B.A. Waterloo, M.A. Carleton,
Sessional Lecturer in History*
J. Guthrie, B.SC. Dalhousie,
Senior Demonstrator in Chemistry*
Sean Haldane, B.A. Oxford,
Sessional Lecturer in English*
Pauline Hemming, M.A. Edinburgh,
Sessional Lecturer in English*
Susan Hendry, B.A. Carleton,
Sessional Lecturer in Spanish*
Walter B. Herbert, B.A., LL.B. Alberta,
Seminar Leader in Journalism*
J. G. Hollins, B.SC. Bristol, PH.D. London,
Demonstrator in Physics*
P. J. Hood, B.SC. London, M.A., PH.D. Toronto,
Sessional Lecturer in Geology*
H. J. Hunter, B.SC. Carleton,
Instructor in Physics*

*Part time

E. Irving, M.A., M.SC., SC.D. Cambridge,
Sessional Lecturer in Geology*
W. N. Irving, B.A. Alaska, PH.D. Wisconsin,
Sessional Lecturer in Sociology*
R. Isaacs, B.A. Carleton,
Sessional Lecturer in French*
J. P. Jan, M.SC., PH.D. Lausanne,
Sessional Lecturer in Physics*
Trudy Kassner, B.A. Hunter,
Sessional Lecturer in German*
Thomas Kerr, B.SC. British Columbia,
Sessional Lecturer in Economics*
Doris Kilbank, M.A. Toronto,
Sessional Lecturer in Spanish*
L. Krupka, B. ès L. Paris,
Sessional Lecturer in French*
Annie Kruus, CERT.TM, Copenhagen,
Senior Demonstrator in Chemistry*
Albert B. Larose, B.COM. Carleton, C.A.,
Sessional Lecturer in Accounting*
K. M. Larose, B.A. Carleton,
Sessional Lecturer in Philosophy*
G. Larson, B.SC. McGill,
Demonstrator in Physics*
B. Leathers, B.A. Carleton,
Sessional Lecturer in Sociology*
J. Lindsay, PH.D. Cambridge,
Demonstrator in Physics*
G. G. Litvan, B.SC. Budapest, PH.D. Toronto,
Sessional Lecturer in Chemistry*
Shannon Lorenzo-Rivero, M.A. Indiana,
Sessional Lecturer in Spanish*
John D. MacDonald, B.SC., B.ED. St. Francis Xavier, B.ENG. Nova Scotia Tech.,
M.ENG. Carleton,
Sessional Lecturer in Engineering*
J. G. MacDonald, B.A. Queen's,
Demonstrator in Geology*
Rachel Manning, B.A. Carleton,
Sessional Lecturer in French*
R. Mansoor, B.A. Carleton,
Sessional Lecturer in Spanish*
R. L. Margeson, B.ENG. Nova Scotia,
Senior Demonstrator in Physics*
B. McIntosh, M.SC. Western Ontario,
Demonstrator in Physics*
Donald McGregor, B.A. Carleton,
Sessional Lecturer in English*
Raymond F. Meyer, B.ENG. New Zealand, PH.D. Manchester,
Sessional Lecturer in Engineering*
Marion Moen, B.SC. British Columbia,
Senior Demonstrator in Chemistry*

*Part time

Betty Mosion,
Sessional Lecturer in Spanish*
M. J. O'Grady, LL.B. Queen's, LL.M. Harvard,
Sessional Lecturer in Public Law*
M. D. Olson, B.A.SC. British Columbia, M.SC., PH.D. Cal. I. T.,
Sessional Lecturer in Engineering*
D. F. Page, B.SC. Queen's, D.I.C., PH.D. London,
Sessional Lecturer in Engineering*
Don Peacock,
Sessional Lecturer in Journalism*
Nuria Peig, LIC. en F. y LETRAS Barcelona,
Sessional Lecturer in Spanish*
Madeleine Pelletier, B.A. Ottawa,
Sessional Lecturer in Spanish*
W. E. Pick, B.ENG. McGill,
Demonstrator in Physics*
Virginia Prince, B.A. Toronto,
Sessional Lecturer in Chemistry*
Bob Prinsky, B.SC. McGill, M.S. Columbia,
Sessional Lecturer in Journalism*
Diana Puschel, B.A. Carleton,
Sessional Lecturer in French*
F. E. Raney, B.ENG. Queen's,
Demonstrator in Physics*
D. Richards, B.A. Carleton,
Sessional Lecturer in German*
Ira D. Richards, M.A. Arkansas, D.PHIL. Tulane,
Sessional Lecturer in History*
Florence E. Robertson, B.SC. Mount Allison, M.SC. McGill,
Demonstrator in Biology*
E. Rolfe, B.SC. London,
Demonstrator in Physics*
N. G. Ross, B.A. Toronto, C.A.,
Sessional Lecturer in Accounting*
S. Russier, C.E.N.S. Sèvies,
Sessional Lecturer in French*
W. F. Ryan, S.J., B.A. Loyola, M.A. Missouri, PH.D. Harvard,
Sessional Lecturer in Economics*
Grace Sangster, B.A. Toronto,
Demonstrator in Physics*
P. W. R. Sargeant, B.SC. Carleton,
Senior Demonstrator in Physics*
Wilson Southam, B.A. McGill, M.A. Oxford,
Seminar Leader in Journalism*
Carolyn Stewart, B.A. Carleton,
Sessional Lecturer in Spanish*
R. J. Talbot, B.SC. Hull,
Senior Demonstrator in Chemistry*
Melville W. Thistle, B.SC., M.A. Mount Allison,
Special Lecturer in Journalism*
Sonia Tilson, M.A., DIP.ED. Wales,
Sessional Lecturer in English*

*Part time

Jo Tombaugh, B.A. Depaw, M.A., PH.D. Missouri,
Sessional Lecturer in Psychology*
Joan Topolski, B.A. Toronto,
Sessional Lecturer in Journalism*
R. Turner, B.A., D.PHIL. Oxford,
Sessional Lecturer in Physics*
Halina van de Lagemaat, B.A. Carleton,
Sessional Lecturer in Russian*
M. Vernet, L. ès L. Paris, D.E.S. Lyon, Agrégé des Lettres Modernes,
Sessional Lecturer in French*
Marjorie Wesche, B.A. Cornell, M.A.T. Oberlin,
Sessional Lecturer in Spanish*
B. R. Weston, B.SC. Ottawa,
Demonstrator in Physics*
Eliezer White, B.SC. Philippines, M.S. Michigan,
Demonstrator in Biology*
Mary A. Wickens, B.SC. Manitoba,
Demonstrator in Geology*
Mary Wilkinson, B.SC. Leeds,
Senior Demonstrator in Chemistry*
E. Stephen Williams, B.A. Carleton,
Sessional Lecturer in Philosophy*
Helen Wilson,
Seminar Leader in Journalism*
G. Peter Wilson, DIPL.S.H.S. Strathclyde,
Sessional Lecturer in Accounting*
Sydney F. Wise, B.A., B.L.S. Toronto, M.A. Queen's,
Research Adviser in History*
Anna Wurtele, M.A. McGill,
Sessional Lecturer in English*
Bruce Yemen, B.A., B.J. Carleton,
Sessional Lecturer in Journalism*

*Part time

Summary of
Admission Requirements
and Courses

Summary of Courses

	Arts	Journalism	Commerce
Degree	B.A. B.A. (Honours)	B.J. B.J. (Honours)	B.Com.
Divisions in which offered	Day & Evening	First 2 years D & E; last 2 years Day only Also as grad. year	Day & Evening
Length of course[1] from Jr. Matric	4 years 5 years for honours	4 years 5 years for honours	5 years
Length of course[1] from Sr. Matric	3 years 4 years for honours	3 years 4 years for honours	4 years
Requirements for admission: to Qualifying Univ. Year	Junior matriculation (Ont. Grade 12 or equivalent) in the following: English; a language other than English; Alg. and Geom.; History; Physics and Chem., or additional lang.; one other acceptable for the Secondary School Graduation diploma with 70% general average. Also scholastic aptitude tests.		
Requirements for admission: to First Year	Senior Matriculation (Ont. Grade 13) in: (1) English (2) a language other than English (3), (4) two options, chosen from history, geography, a second language, a science, Mathematics A or Mathematics A and B or 2 or 3 of algebra, geometry, trigonometry. (Any offering or combination of offerings in Mathematics will count only as one option) Average: 60% For Honours: 65% For specific major requirements see page 50. For requirements regarding early admission, See Page 35.	As for Arts Average: 60% For honours: 65% and approval of the Director.	As for Arts, but Mathematics A or algebra and trigonometry must be presented. Average: 60%
	The above requirements apply to students who take Grade 13 in one year; students spending two years in Grade 13 must present five subjects.	All applicants must take Scholastic Aptitude Tests (verbal and mathematical) of the Ontario Institute for Studies in Education or the College Entrance Examination Board.	
Annual tuition[2]	$537.50	$537.50	$537.50

[1]Length shown is that for full-time students; part-time students plan courses over longer periods.

Science	Engineering	Architecture	Graduate Studies
B.Sc. B.Sc. (Honours)	B.Eng.	B.Arch.	M.A., M.Sc., M.Eng., Ph.D., in certain fields of Arts, Science, and Engineering. Graduate Diploma and M.A. in Public Admin., M.A. in Canadian Studies, M.A. in International Affairs, B.J. as post-graduate year. For details, see pp. 88-90.
Day & Evening (Certain senior courses offered day division only)	Day only	Day only	
4 years 5 years for honours	5 years	6 years	
3 years 4 years for honours	4 years	5 years	

<table>
<tr><th></th><th></th><th></th><th>Other</th></tr>
<tr>
<td>(1) Mathematics A and B or algebra, geometry and trigonometry
(2), (3) two experimental sciences, chosen from biology, chemistry, physics
(4) an option, chosen from English, history, geography, a language, or a third science

Average: 60%
For honours: 65%</td>
<td>(1) Mathematics A and B or algebra, geometry and trigonometry
(2) physics
(3) chemistry
(4) an option, chosen from English, a language other than English, history, geography, biology

Average: 60%</td>
<td>(1) Mathematics A and B, or algebra, geometry and trigonometry
(2) physics
(3), (4) two other acceptable subjects, preferably chemistry and English

Average: 60%</td>
<td>Certificate course in Public Service Studies

Special programs of one or more subjects, chosen from those offered in the degree course or in the Extension Department, may be planned to meet the needs of individual students, including those without jr. matric. as well as those with post-grad. degrees.</td>
</tr>
</table>

Applicants from other provinces must present acceptable equivalent certificates generally required for admission to universities in their own provinces. (see p. 34).

$537.50	$597.50	$597.50	$97.50 or $117.50 per course for part-time

[2]The Board of Governors reserves the right to amend its published schedule of fees without notice.

Examinations Equivalent to the Ontario Secondary School Graduation Diploma:
The following certificates recognized as equivalent to the Ontario Secondary School
Graduation diploma may be accepted in so far as they meet the admission require-
ments of Carleton University (see p. 49).

Quebec	Quebec High School Leaving, or McGill Junior Matriculation, or equivalent (Grade 11)
Alberta	Junior Matriculation (Grade 11)
British Columbia	Junior Matriculation (Grade 12)
Manitoba	Junior Matriculation (Grade 11)
New Brunswick	Junior Matriculation (Grade 12)
Newfoundland	Junior Matriculation (Grade 11)
Nova Scotia	Junior Matriculation (Grade 11)
Prince Edward Island	First Class License or Second Year Certificate from Prince of Wales College
Saskatchewan	Junior Matriculation (Grade 11)
United States	High School Graduation

Examinations Equivalent to Ontario Grade 13
The following certificates recognized as equivalent to the Ontario Grade 13 certificate
may be accepted in so far as they meet the Senior Matriculation requirements of
Carleton University.

Quebec	Quebec Senior High School Leaving Certificate, or McGill Senior Matriculation (Grade 12)
Alberta	Senior Matriculation (Grade 12)
British Columbia	Senior Matriculation (Grade 13)
Manitoba	Senior Matriculation (Grade 12)
New Brunswick	Senior Matriculation (Grade 13)
Nova Scotia	Senior Matriculation (Grade 12)
Prince Edward Island	Honour Diploma of Third Year, Prince of Wales College
Saskatchewan	Senior Matriculation (Grade 12)
England, N. Ireland, & Wales	The General Certificate of the various English Univer-sities and the Welsh Joint Education Committee with passes in five subjects, two of which must be at the Advanced Level
Scotland	The Scottish Universities Entrance Board's Certificate of Attestation of Fitness

Successful candidates will be notified of Early Admission soon after May 15, 1968 and will be asked to confirm their acceptance by June 15, 1968.

To First Year

Carleton University will grant Early Final Admission for the 1968-69 session to well-qualified applicants who:

a) Submit an application by April 15, 1968

b) Present better-than-average standing
   — in Junior Matriculation
   — in Christmas examinations and Easter examinations (or spring report on performance) in Grade 13.

c) Have written Scholastic Aptitude Tests (Verbal and Mathematical) of the Ontario Institute for Studies in Education or the College Entrance Examination Board.

d) Have a satisfactory Principal's Report.

This admission is dependent on the student completing the school year to the satisfaction of the Principal.

To Qualifying University Year

Carleton University will grant Early Final Admission for the 1968-69 session to applicants who meet the following requirements:

a) Apply from provinces in Canada where high school is normally complete with Junior Matriculation.

b) Have a 75% or better average in the Christmas and Spring examinations in the final year of Junior Matriculation.

c) Have written the Scholastic Aptitude tests of the College Entrance Examination Board.

d) Have satisfactory standing in the Principal's Confidential Report.

This admission is dependent on the student writing final examinations.

Courses for those who are not candidates for certificate, diploma, or degree

Subjects in the curricula of the Faculties of Arts, Science, and the School of Public Administration are open to persons who do not wish to study for a certificate, diploma, or degree, provided that they have the required background for those they choose; or provided they enrol in introductory courses for which space is available.

As an extension service, non-credit courses in subjects of cultural and vocational value are open to members of the public. The Committee on Adult Education issues a bulletin describing this program. Copies may be obtained, on request, from the Registrar's Office.

Pre-Professional Courses

Students who plan to undertake further professional training after completion of their studies at Carleton University are invited to consult the Registrar for aid in selection of their courses.

Among the fields for which preparatory courses may be planned at Carleton are: Medicine, Dentistry, Law, Theology, Teaching, Library Science, Social Work, Accountancy.

Fees

The annual composite fee includes tuition, Students' Association, Athletics, and Health Service fees, and where applicable laboratory, graduation, and summer survey camp fees. Because the calendar must be prepared so far in advance of the academic year the University must reserve the right to change fees without notice.

Arts, Commerce, Journalism, Science:

Students taking 4 or more subjects	$537.50
Part-time students taking fewer than 4 subjects (per subject):	
Registered in a degree program	$ 97.50
Not registered in a degree program	$117.50

Engineering:

Full-time students	$597.50

Architecture:

Full-time students	$597.50

(See Withdrawal and Refund, p. 37).
Included in the above composite fee are the following:

	Part-time per subject	Full-time
Students' Association	2.00	20.00
Athletics	2.50	24.00
Health Services	—	3.50
University Union Contribution (as voted by student body)		10.00

Graduate Fee
See Faculty of Graduate Studies, p. 90.

Late Registration Fee
$10 first week after registration period
$15 second week
Part-time students:
$1 (per course) first week after registration period
$2 (per course) second week

Examination Fees

a) Supplemental and special final examinations, written at Carleton University, per paper	5.00
b) Examinations written at a university centre other than Carleton University, when permitted	10.00

Transcript Fees
All students are entitled to two free transcripts. After these have been issued the fee is $1.00 for the first, 50 cents for the second, and 25 cents for each additional copy at any one time of ordering.

Fees may be paid by any of the following plans:
1. Payment in full at the time of registration.
2. Payment in two instalments:
a) At registration—½ of the total tuition, plus Miscellaneous Fees (where applicable), and Deferred Payment Fee $ .50 per half course (5 courses $5.00).
b) At or before mid-session—the remaining half of the total tuition fee.
3. Payments in five instalments (winter session only):
a) At registration—⅕ of the total tuition, plus Miscellaneous Fees (where applicable), and Deferred Payment Fee $1.25 per half course (5 courses $12.50).
b) On the 15th of October, November, January, and February—⅕ of the total tuition fee.

Withdrawal and Refund
see also p. 36.
The composite fee for full-time students is a charge for four subjects or more. No charge is made for the fifth or any additional subjects; conversely, no refund will arise as a result of withdrawal from a subject by a full-time student unless the change alters his status from full-time to part-time.

Students who are forced to withdraw from a course, or from the University, are required to notify the Registrar in writing, or fill out the appropriate forms in his office, and to give their reasons for withdrawal. Students who withdraw from the University must return their identity card to the Registrar's office immediately. Refunds will be calculated by the date of receipt of the card.

Credits or refunds will be granted as follows:
a) Cash refunds:
1. Cash refunds will be granted in cases where students are compelled to withdraw on account of serious and continued personal illness.
2. In case a student who is regularly employed during the day is sent out of the city permanently by his employer or compelled so to change his working hours as to prevent his continuing at the University, a refund will be granted.
3. Cash refunds may also be granted in cases where the student is compelled to withdraw for other personal reasons, provided that these reasons are satisfactory to the University authorities.
b) Tuition not refunded or used may, if a certificate of credit is secured from the Bursar, be applied upon subsequent courses pursued in the University, provided such courses are taken within two years of the date of withdrawal of the student.
c) Miscellaneous fees and Deferred Payment fees are not refundable.
d) The portion of the tuition fee refunded is determined by the date of the return of the student identity card with a written notice of withdrawal.
e) No application for withdrawal and refund will be considered if received after February 15 in the winter session (in the case of first term courses, November 15) or after July 31 in the summer session.

Residence
A detailed statement of approximate cost of one year (8 months) at the University will be found on p. 273.
Residence fees, (including $4.00 residence association fee), payable in one or two instalments are:
Single room $865.00
Double room $815.00
If paid in two instalments there is an additional deferred payment of $8.00.
Total fee, or the first instalment, is due prior to admittance to residence.
First instalment (in addition to the room deposit) is $431.00 for a single room, $406.00 for a double.
The second instalment is due on January 2, and is $417.00 for a single room and $392.00 for a double room.
A deposit of $25 must accompany applications and will become applicable to rental charges upon admission to residence. This will be refunded only under the following circumstances:
a) If applicant fails to qualify for admission to Carleton University.
b) If applicant is not allotted a place in residence.

Parking
Permission to park on the campus is granted for a small fee to students and others associated with the university, but this permission is conditional upon co-operation in

the observance of the regulations. Infractions will be penalized, and under certain circumstances cars will be towed away at the owner's expense and risk. In this, as in other respects, examination grades will be withheld from students owing sums of money to the university. Unless cause can be shown, the third infraction will lead to withdrawal of parking privileges. The university accepts no responsibility for cars or their contents parked or operated on the campus. Applications for parking permits and the regulations related thereto are available in the Business office; students and staff who bring cars to the campus are expected to make themselves familiar with these regulations.

Delinquent Accounts
If, when examination results are ready for publication, a student owes the University any account such as fees, library charges, traffic violation fines and other incidental bills, his results will not be released, his file will be sealed, and he will not be permitted to register again until such accounts have been paid in full.

General Regulations

Application to Committee on Admission and Studies
Students seeking special consideration under the regulations described in this section should apply to the Assistant Registrar who is the Secretary of the Committee on Admission and Studies.

Classification of Students
Full-time undergraduate or graduate students are those enrolled during an academic session in four or five courses, or the equivalent, which lead to a degree, diploma or certificate. These students are admitted under the provisions set out for each faculty. Part-time students are those enrolled during an academic session in less than four courses which lead to a degree, diploma, or certificate. The following may be admitted as part-time students:
1. Persons who have met the full requirements for admission as full-time students.
2. Persons twenty-three years of age and over who are accepted as mature matriculants for part-time studies.
3. Persons under twenty-three years of age not having full requirements for admission as full-time students but giving evidence of the likelihood of success in university studies, who may be accepted on probation.
4. Persons already holding baccalaureate degrees who wish to take courses in addition to those already counted as credit for their degree.
5. Former full-time students who have not failed a year twice. Part-time students may be required to withdraw if they do not, after supplementals, pass three of the first five courses taken. Part-time students must have their course pattern and degree requirements specifically assessed at the latest after taking five courses.
Any others taking courses are classified as special students.

Credit for Senior Matriculation Courses
No more than five senior matriculation courses taken in a secondary school may be counted toward a Carleton degree.
Except by permission of the Committee on Admission and Studies, no student will be given credit for senior matriculation courses passed in a secondary school system after he has been registered as an undergraduate in Carleton University.

Admission of Transfer Students
Students transferring to Carleton University from other universities with a 60% or better average and with no outstanding failures may be admitted without being held to any of the Carleton First year requirements which were not taken in earlier university studies.
Departments, however, retain the right to ask that deficiencies below the student's current level be fulfilled. Undeclared majors will be held to regular requirements. Students transferring with a lower than 60% average, if admitted by the Committee on Admission and Studies, will be required to fulfill all requirements.

Mature Matriculants
A person over the age of twenty-three years who, though lacking the admission requirements specified, can give evidence of the likelihood of success in university studies, may be admitted either to Qualifying or to First year.

Substitution for Prescribed Language Courses
A student whose mother tongue is not offered at Carleton University as a language course, and whose secondary schooling was in a country other than Canada, may substitute a prescribed course in the Humanities or Social Sciences for the required language courses.

Proficiency in English
All students at the University are required to be proficient in the use of the English language. In any year of his course, a student may be referred by any instructor to the Department of English, which will decide whether he must receive additional tuition.

Course Load
Normal course load for a full-time student in the winter session is five courses. Except in the honours or engineering programs, no more than five full courses may be taken for credit in the winter session, unless by permission of the Committee on Admission and Studies.

All transfers must be made within two weeks following the opening of classes. A student who has been in full-time attendance at the University in a winter session may take a course (or two courses if not otherwise fully employed) in the following summer session if it is recommended by his major department. Students not identified with a major department must consult the Registrar.

Normal course load for a part-time student is one or two courses in each winter session and one course in each summer session. An extra course may be taken in either session with the permission of the Committee on Admission and Studies.

Students may not take two courses in the Summer School Day Division unless the Committee on Admission and Studies makes exceptions. The Committee on Admission and Studies will permit a student to take an extra course for credit only if in the previous academic session he obtained better than average standing, that is, 66% or better.

With the consent of the instructor an undergraduate student or graduate student enrolled for degree credit may audit credit courses (i.e. attend without the privilege of writing examinations) in addition to those being taken for credit. Full-time students may do so without additional fee, all others must pay the regular course fee. Such students must state their auditor status at the time of registration. Part-time students who enrol to audit courses but fail to indicate their intentions and then are absent from examinations will endanger their right to enrol in further courses.

Attendance
A student is expected to attend all lectures, discussion groups, seminars, laboratory periods, and examinations in any courses in which he is registered, whether these are formally scheduled by the University Registrar or informally announced by the instructor. Exceptions to this rule may be made for certified medical disability, or for other good cause acceptable to the Committee on Admission and Studies.

Each instructor will inform his classes early in the session of the relation of class attendance to course grades, and whether attendance records shall be kept.

Grading
Standing in all courses in this University with effect from the beginning of the Winter Session 1967-68 is shown by percentage grades, including failure. With respect to individual courses, and starting with examinations in December 1967, letter grades as usually understood and class designations are equivalent to percentages as follows:

$$75\% - 100\% - \text{First Class} \qquad \text{(or A)}$$
$$66\% - 74\% - \text{Second Class} \qquad \text{(or B)}$$
$$60\% - 65\% - \text{Third Class} \qquad \text{(or C)}$$
$$50\% - 59\% - \text{Pass} \qquad \text{(or D)}$$

For the purpose of calculating equivalent standing in all courses in this University previously graded by the letters A, B, C and D (that is, prior to the Winter Session 1967-68) the following percentage values should be used:

A+ — 92%	B+ — 78%	C+ — 68%	D+ — 58%
A — 85%	B — 75%	C — 65%	D — 55%
A— — 81%	B— — 71%	C— — 61%	D— — 51%

Additional symbols used to indicate standing

Aeg. Aegrotat: absent from final examination, but granted standing on basis of year's work (a student granted aegrotat may write a special examination for a grade in the course). See p. 44 (Special Examinations)

Pass. Passed supplemental examination but not otherwise graded. (Value equals 50%)

Abs. Absent from the final examination. (At the discretion of the instructor, a student who is absent from the final examination may be graded "F(ns)": see below.)

F(ns) Failure: no supplemental examination allowed. This is normally given when a student has unsatisfactory laboratory work or unsatisfactory term assignments, or, if his term work is not completed before the first day of final examinations, or if he receives a mark so low in the final examination that the privilege of a supplemental is not justified.

Wdn. Withdrawn in good standing.

Standing

A student's standing in his year's work will be determined not only by the results of mid-year and final examinations, but also by the work of the whole session, including class tests, laboratory work, essays, attendance, progress, and any other matters bearing on the candidate's worth as a student of the University.

The Senate may, at any time, either during the term or after the close of the term, require a student to withdraw from the University if his conduct, attendance, work, or progress is deemed unsatisfactory.

Promotion

To be eligible for promotion to the next year a student must pass at least three courses before supplementals and at least four courses after supplementals (and/or Summer School courses if taken and credit obtained) with a minimum grade of 60% in at least one subject. The requirement of passing four courses after supplemental examinations for promotion applies to all full-time students taking four, five or six courses.

To be eligible to repeat a failed year, a student must pass at least two courses with a minimum of 120 marks, three courses with 160 marks, or pass four or more courses with 200 marks. This is referred to as Category I.

When a student has failed his year and may not repeat it as a full-time student until the following Winter Session, he may return as a part-time student in one or two courses only during the intervening period. This is referred to as Category II.

A student in Category II who elects to take one or two courses during the year in which he is not permitted to attend full time, must present a 60% average in these courses when applying for re-admission as a full-time student. If a student fails to meet these requirements, he must continue on a part-time basis for one further year before applying for re-admission.

When a student has failed his year after having previously failed a year at university, he has forfeited his undergraduate status. This is referred to as Category III.

A student in Category III must pass five courses with an overall average of 60% during a minimum of two years before he may apply for and be considered for

re-admission. These students are special students and are subject also to the regulations affecting special students.

No student may write more that a total of two supplemental (including special supplementals) and/or Summer School final examinations in August. That is, he may write two supplementals (including special supplementals) or one supplemental (including special supplementals) and one Summer School final examination, or two Summer School final examinations.

No supplemental examinations will be permitted in Summer School for students who have been registered as full-time students in the previous Winter Session except potential fall graduands.

It is the responsibility of the major departments to see that students progress in an orderly fashion, according to University and departmental regulations, and that all Qualifying and First year requirements are met without undue delay.

To enter Third year, a student must have at least 60% in the courses of his major subject or subjects. He must also comply with additional requirements of his course program.

A student below the required minimum standard at the end of his year prior to graduation may be required to withdraw from his major field by the department.

Part-time and special students (except those on probation) must pass at least three of the first five courses taken in succession, at least three of the next five courses, and so on in order to be eligible for registration in any further course at Carleton University. Any such student who fails three courses taken in succession will not be allowed to register in any course.

Additional conditions for promotion — Faculty of Science

To be eligible for promotion to Second year and entry to a major program a student (full or part-time) must have satisfied the University regulations set forth above and have obtained at least two grades of 65%, one of which must have been in the subject in which he intends to major. A student who does not fail First year, but does not meet the above requirement, must repeat two of the courses in which he did not receive a grade of 60% or better, or replace them by equivalent courses. His program must be approved by the department in which he intends to major.

Additional conditions for promotion — Faculty of Engineering

The general regulations regarding failure, repetition, and probation are outlined above. In order to qualify for promotion from one year to the next, an engineering student must have passed either the final or the supplemental examination in every subject of his program, with a weighted average of at least 58%.

To qualify for supplemental examination privileges a student must attain a weighted average of at least 54% in the final examinations.

If, after final and supplemental examinations, a student has failed to achieve standing in a subject which is a prerequisite for the course work of the following year, he may repeat the year's work or clear the deficiency as a part-time student. If the failed subject is not a prerequisite for the course work of the following year, the student may be conditionally promoted and may be permitted to repeat the failed subject as an extra subject, provided his weighted average is at least 60%.

If the academic standing of an engineering student does not meet the minimum promotion requirements, he may *either* clear his deficiency as a part-time student *or* apply to the Committee on Admission and Studies for permission to repeat the year's work. If permission is granted, he will be placed on probation for that academic year. The academic load for a repeated year in engineering must be at least the equivalent of 15 hours of lectures and 9 hours of laboratory a week or 18 hours of lectures and 6 hours of laboratory a week. Subjects in which 70% or better was obtained

need not be repeated. The required subjects of the succeeding year may be included as part of a repeated year program provided 70% or better was obtained in the prerequisite subjects.

Requirements for Graduation
Students expecting to graduate in the spring should make application on the appropriate form in the Registrar's office by February 1, and those expecting to graduate in the fall, by September 1.

To qualify for graduation with a Pass degree a student must have (1) 60% or over in at least half the courses taken at Carleton; (2) at least a 60% average in his major subject or subjects; (3) at least 50% in the remainder of the courses counted toward his degree and, (4) the recommendation of his major department and Faculty. (For regulations governing graduation in Engineering, see p. 80).

Only those courses in the major field necessary to make up the required total for graduation need be counted, but the obligatory courses must be counted.

Any Qualifying year courses taken to remove entrance deficiencies at that level may not be counted when computing the 60% requirement for graduation.

In those instances in which an undergraduate in course at Carleton takes courses elsewhere, with permission from his department and the Committee on Admission and Studies, the grades received may be incorporated with those from Carleton.

Graduation with Distinction
Students in the pass course who have on graduation an average of at least 75% on all courses counted for credit, and who are recommended by their major department, will be designated as graduating *with distinction*.

Failure
A student who has not satisfied the conditions for promotion has failed his year. A student who has failed his year will retain credit only for those courses in which he obtained 60% or higher standing, and must repeat the other courses of that year. (For regulations governing failure in Engineering, see p. 79).

Probation
A student who has failed his year at Carleton University or elsewhere may apply to the Committee on Admission and Studies for permission to repeat the year's work. If permission is granted, he will be placed on probation for that academic year. A student on probation must pass five courses with at least 60% in one subject, or pass four with an average of 66% at the end of the August supplemental or Summer School final examination period. A part-time student placed on probation must pass five courses in succession at Carleton in order to regain good standing. Students must in all cases meet the terms of probation assigned by the Committee on Admission and Studies.

Forfeiture of Status
An undergraduate who has failed his year twice forfeits his undergraduate status.

Withdrawal
Students who wish to withdraw from courses must apply in writing to the Registrar or fill out the appropriate forms in his office.

A student may not withdraw in *good standing* from any course for which he is registered, after February 15 in the winter session (October 31 in the case of half courses in the first term) or July 28 in the summer session, except by permission of the Committee on Admission and Studies. If the student should withdraw from a

course without such permission and fail to write the final examination, his record will show that he was absent from the examination and he shall not have the privilege of writing a supplemental examination in that subject.

Examinations

Mid-year examinations are held in all Qualifying University year and First year courses and in other courses at the discretion of the instructor, and *final* examinations are held in all courses, at the times listed under the Academic Year, p. 1. A single, joint *final* examination may be set for day and evening classes in each course, usually during morning and afternoon hours. In courses in which no formal mid-year examinations are held, mid-year grades will be given when possible on the basis of assignments, tests, and other term work during the first term.

A student who is absent from a university final examination in Qualifying or First year courses will receive no credit in the course. Exceptions to this rule may be made for certified medical disability, or for other good cause acceptable to the Committee on Admission and Studies.

Special Examinations

A student may not be able to write the scheduled mid-year or final examination in a course because of illness. He may apply for aegrotat standing or for permission to write a special examination provided he presents the appropriate (University) medical certificate to the Committee on Admission and Studies. This certificate requires a statement by his attending physician that he was ill at the time of the examination. Students actually under medical treatment in the period immediately prior to the examinations are reminded that it is their responsibility to notify the University that this situation exists if it will affect their attendance at the examination.

Reasons other than medical must also be fully documented for consideration by the Committee.

A student whose reason for missing the final examination has been accepted by the Committee may be required, or may apply for permission, to take a special *final* examination. Special final examinations, and arrangements for taking them, may be authorized only by the Committee on Admission and Studies. These examinations are written at the time of the supplemental examinations.

Applications for aegrotat standing, or for permission to write special examinations, must be submitted in writing to the Committee on Admission and Studies through the Assistant Registrar. The reason for missing the regular examination must be stated and confirmed by documents. The application must be made not later than one week after the date of the examination.

Supplemental Examinations

To be eligible for supplemental privileges a full-time student must have passed at least three courses.

Students registered for five or more courses are eligible to write two regular and/or special supplementals. Students registered for four courses may write one regular and one special supplemental examination only, or two special supplemental examinations. Students who fail their year are not eligible to write either regular or supplemental examinations.

Students registered for one, two or three courses, who fail one course only, may write a supplemental. Students registered for two or three courses who fail two courses are not eligible to write supplemental examinations.

All supplemental examinations in courses during the winter session are held in August, at the University, with the exception of supplemental examinations for January half-course finals—these are held in March. Summer course supplemental examinations are

written in October. For exact dates, see the Academic Year, p. 1. Fees are shown on p. 36.

An undergraduate student who has failed on a final examination, but has not failed his year, may write a supplemental examination in that subject at the time of the next regular supplemental examinations. In such cases, the supplemental examination ordinarily will be graded only "Pass" or "Failure".

The privilege of writing supplemental examinations will be denied where students have been graded "F(ns)" (see p. 41); such students shall, however, have the right of appeal to the Committee on Admission and Studies. Special regulations govern Honours, Engineering, and Graduate Studies.

No student may write supplemental (including special supplemental) examinations in more than two courses or the equivalent in half-courses in any year.

Special Supplemental Examinations

A student wishing to raise a grade in a course already passed may apply to the Committee for permission to write a special supplemental examination. (A special supplemental examination is the same as an ordinary supplemental examination except that it is graded.)

Not more than three special supplemental examinations may be taken in a student's degree program.

The privilege of writing a special supplemental examination to raise a grade in a course already passed is extended to students in the Qualifying year, this to count as one of the three special supplemental examinations which may be taken in a student's degree program.

Special supplemental examinations to raise a grade are available only to students in a degree program and not to special students.

A student who is granted permission to rewrite a subject for higher standing may do so once only, at the next regularly scheduled examination period. Students are advised that when they write special supplemental examinations for the purpose of raising their standing, the final grade assigned in any subject will be based on the whole year's work, including the supplemental; that the grade so obtained shall be the grade of the special examination including term work if appropriate.

If a supplemental examination is failed, the student will be required to repeat the course before writing an examination in that course in any subsequent year.

Release of Grades

Official course grades are released only by the Registrar. Year-end reports are mailed to students as soon as possible after the release of grades has been authorized. Upon the request of a student, a duplicate of his report will be sent to his employer or another designated person.

Review of Grades

A student who has failed one or more courses may obtain a review of his Spring final grades by applying in writing to the Registrar within fourteen days after the release of the final examination results and paying a fee of $10 for each grade he wishes to have reviewed. The request for review will be dealt with by the chairman of the department in consultation with members of the staff. The fee will be refunded if the grade is raised. Students awaiting the outcome of a review must still make application for supplemental examinations by the prescribed deadline.

Library Regulations

All persons taking courses in the University, and all graduates of the University, are entitled to use the library the year round. As a condition of use of the library, all

users must submit books, brief cases, bags, etc. for inspection at the exit, if requested to do so. Library hours are listed on the inside back cover.

Most books may be borrowed for two weeks. Some books are placed on "Reserve" and may be borrowed overnight, for three days, or for one week. Alumni may not borrow reserve books, which are in heavy demand. If books are not returned when due, fines are charged. As noted under "Parking", examination grades and transcripts will be withheld from students owing money to the University.

Reference books may not be taken from the library.

Every undergraduate entering the Qualifying University or First year in the day division will be required to complete satisfactorily an exercise in the use of the library, including card catalogue, bibliographical sources, and standard reference works.

Academic Dress

The academic dress of Carleton University is a compromise between the style of hoods outlined in the American Intercollegiate Code and the dress of the ancient foundations of Britain and America. The Bachelor's hood is of simple or Oxford shape, made of black *stuff* and lined with two chevrons of red and black on a silver field. The border of the hood denotes the degree granted according to the following colour combinations: Arts—white; Journalism—white with a black cord sewn slightly in from the lower border; Science—golden yellow; Commerce—drab; Engineering—orange. The Master's hood, made of black silk, is again of the simple shape but open to show more of the lining. The borders follow the colour scheme just outlined. The Doctor of Philosophy hood is again made of silk, but completely opened to show the lining and provided with a purple border.

The Bachelor's gown, to be worn with the above hoods, is of full length, made of black *stuff*, with a gathered yoke behind, and long open-fronted sleeves. The Master's gown is of full style, made of black silk or rayon, with full gathered yoke behind and closed sleeves with an opening at the elbows. The Doctoral gown is the same style as the Master's, made of fine royal blue cloth with facings of a light blue silk.

The gown of the Honorary Doctor of Laws or of Science is a blue robe with bell-shaped sleeves, made of fine royal blue cloth with facings and sleeves in light blue silk. The hood is made of the same material as the gown, has the same lining as that for the degrees granted by examination, and is bordered with purple for the Degree of Doctor of Laws, dark red for the Degree of Doctor of Science and orange for the Degree of Doctor of Engineering.

Health

1. At registration entering full-time students are required to submit the official medical record form completed by his personal physician.

2. Annually, at registration students are required to submit evidence of having had a chest X-ray or an intracutaneous tubercular skin test within the previous six months showing negative results.

Students who object to the fulfilment of the above requirements on conscientious grounds must consult the University physician and provide a written statement giving the basis of objection.

3. Before participating in University extramural athletics, students must be certified physically fit for such participation by the University physician.

4. Overseas students are required to have hospital insurance while enrolled at the University. Coverage by the Ontario Hospital Services Commission is available after a three months waiting period. The University has a plan available which will provide coverage during the waiting period.

General Regulations for Honours Degrees

A student wishing to enter an honours program must, in the first instance, apply to the Chairman of the department in the honours subject. Admission to honours at any level will require the consent of the department in which the honours subject is taken, and the approval of the appropriate committee on honours.

Each department's course patterns are detailed individually. The student should therefore consult the Calendar instructions for honours programs in the appropriate department.

Entry to Honours

For entry into the First year a student must have at least a 65% average in Grade 13 or an average of at least 60% in the Carleton Qualifying year. For entry into or for remaining in the Second, Third or Fourth year of an honours program, a student must have at least Third Class standing (i.e. 60% in the honours subjects and 58% overall), and the recommendation of his department.

If a student in his final year of a Pass degree wishes to be considered for entry into the Fourth year of an honours program, he must apply to the department for his name to be withdrawn from the graduation list before March 1 of that year. If subsequently he is not accepted for an honours program, his name will be returned to the graduation list.

Honours regulations are currently being reviewed and new regulations will appear in a supplement to this Calendar to be published later in the year.

A student wishing to improve his average may, with the permission of his honours department, take a supplemental or special supplemental examination, or may repeat a course, provided the total number of these examinations and repeated courses does not exceed three in his entire program beyond the Qualifying year.

A student who fails to maintain honours standing must withdraw from Honours; he may apply for admission to a pass program.

Fourth year graduating essays, theses or special projects must be submitted to the chairman of the honours department before April 1, or such other date as the department may specify, for the Spring graduation, or by the first day of classes in September for the Fall graduation. If the essay, thesis, or special project has not been submitted for the first day of classes in September for the year following the registration for that course, the student may reregister for it and pay the appropriate fee for the course.

Combined Honours

A student wishing to enter a combined honours program must, in the first instance, apply to the chairman of each department of the honours subjects. The above regulations apply throughout except that the term "the honours subject" is to be replaced by "each of the honours subjects", and "the honours department" by "each of the honours departments".

Classes of Honours Degrees

See also

Faculty of Arts

Dean of the Faculty: David M. L. Farr, M.A., D.PHIL.
Associate Dean: Gordon C. Merrill, M.A., PH.D.
Assistant to the Dean: A. D. McLay, M.A.

Division I: Director, D. M. L. Farr.

Art	French	Music
Canadian Studies	German	Philosophy
Classics	History	Religion
Comparative Literature	Italian	Russian
English	Journalism	Spanish

Division II: Director, G. C. Merrill.

Accounting	Political Science
Anthropology	Psychology
Commerce	Public Administration
Economics	Public Law
Geography	Sociology
International Affairs	Soviet and East European Studies

Admission Requirements

To the Qualifying University year of courses leading to the Bachelor of Arts degree:

Junior Matriculation—the Ontario Secondary School Graduation Diploma in the General Course (Grade 12), or an equivalent certificate, with a general average of at least 70%.

Standing is required in the following subjects:
1. English.
2. Mathematics
3. History.
4. A language other than English.
5. Science (Physics and Chemistry; or Agricultural Science, Parts I and II) or an additional language.
6. One other acceptable for the Graduation Diploma.

To the First year of courses leading to the Bachelor of Arts degree:

a) Completion of the Qualifying University year, *or*

b) Ontario Grade 13[1], with a 60% general average in the following subjects:
1. English
2. A language other than English
3. and 4. Two options chosen from:
      History
      Geography
      A second language
      A science
      Mathematics A, or Mathematics A and B, or two or three of Algebra, Geometry, Trigonometry. (Any offering or combination of offerings in Mathematics will count only as one option.)

The above requirements apply to students who take Grade 13 in one year; students spending two years in Grade 13 must present *five* subjects.

[1]Applicants from other provinces must present acceptable equivalent certificates generally required for admission to universities in their own provinces.

For a major in Mathematics, one option must be Mathematics A and B.

For majors in Biology and Economics, one option must be Mathematics A, but it is recommended that students present Mathematics A and B.

For a major in Geography, it is recommended that students present Mathematics A as one option.

See also p. 39, Credit for Senior Matriculation courses.

All applicants must take Scholastic Aptitude Tests (verbal and mathematical) of the Ontario Institute for Studies in Education or the College Entrance Examination Board.

Mature Matriculation—A person over the age of twenty-three years who, though lacking the admission requirements specified above, can give evidence of the likelihood of success in university studies, may be admitted on probation either to Qualifying or to First year. Persons interested should consult the Registrar. This provision applies to persons wishing to study full-time. Others can test their capability by taking courses as part-time students in the Evening Division.

To the Second or subsequent years of courses leading to the Bachelor of Arts degree: Applications for admission to the Second or subsequent years will be evaluated on their merits, and advanced standing will be granted for studies undertaken elsewhere only when these are recognized as the equivalent of courses offered in Carleton University.

Every student will be required to complete at least his last five courses in Carleton University.

Course Requirements

Bachelor of Arts (Offered in both Day and Evening Divisions).

Length of course. Candidates in the B.A. degree program will take a total of twenty courses after Junior Matriculation, or fifteen after Senior Matriculation. See also Course Load, p. 40.

Course selection. The B.A. program is designed to provide opportunity for a liberal education, including specialization in one subject of study, called a *major*. A *combined major* in two subjects may be taken, with the consent of the departments concerned. Students majoring in a single subject will take from five to seven courses in that subject, depending upon departmental requirements, while students electing a combined major will take four or five courses in each subject of the major.

The choice of a major will normally be made upon entry to the Second year, in consultation with the department or departments concerned. A student who has not chosen a major at this point will be required to obtain approval for his courses from the Faculty adviser to undeclared majors. A change in major may be made only with the approval of both the departments concerned.

Subjects for majors and combined majors are as follows:

Anthropology, Classics (Latin, Greek), Economics, English, French, Geography, German, History, Mathematics, Philosophy, Political Science, Psychology, Religion, Russian, Sociology, Spanish. (In certain cases, and with consent of the Department of Biology, a major in Biology in the B.A. course may be taken.)

Courses will be selected from those listed under Details of Courses, p. 98, as follows:

Qualifying University Year
1. English 18.010.
2. A language other than English (a course numbered between 010 and 099).
3. Mathematics 69.010 or one of French 20.010, German 22.015, Greek 15.015, Italian 26.015, Latin 16.015, Russian 36.015, Spanish 38.015. For students intending to major in Economics, standing in Mathematics 69.010 is required.
4. A science: Biology 61.100 or Chemistry 65.010 or Physics 75.010 or Geology 67.100.
5. History 24.010, or another language, or an additional science, or Mathematics 69.011.

First Year
Either one of two of the requirements specified may be *deferred* until the second year, to permit substitution in the first year of an additional course or courses chosen from areas 2, 3, or 4, or from Art 11.100 or Music 30.100.

1. A course in English literature; *one* of:
English 18.100, 18.101, 18.102, 18.162

2. An introduction to the problems of thought and conduct; *one* of:
Philosophy 32.100, 32.105, 32.110, 32.120
Humanities 10.100
Religion 34.100, 34.120

3. An introduction to the study of society; *one* of:
Anthropology 54.110
Economics 43.100
History 24.100, 24.112, 24.115
Political Science 47.100, 47.101
Psychology 49.100
Sociology 53.100, 53.101, 53.102

4. A continuing language other than English; *one* of:
French 20.100, 20.101, 20.102
German 22.100
Greek 15.100
Italian 26.100
Latin 16.100
Russian 36.100
Spanish 38.100, 38.101
(Note that except in French and Latin, this may require a prerequisite course numbered 015, which will carry a credit.)

5. A course in Science; *one* of:
Mathematics 69.100, 69.101, 69.130
(Mathematics 69.101 is a requirement for students whose major department is Economics)
Science 60.100
Biology 61.100
Chemistry 65.010, 65.100
Geology 67.100
(If Geology 67.100 has been taken previously, Earth Science 45.100 will carry only a half credit, and vice versa.)
Earth Science 45.100
Physics 75.010, 75.100, 75.105

An asterisk attached to a course number indicates a half course; see p. 98.

Second and Third Years

A total of ten courses, five in each year: a minimum of four of these to be in the student's major (five, if one is not taken in First year). The others are to be chosen with the approval of the major departments.

Bachelor of Arts with Honours

The degree of Bachelor of Arts with Honours is designed for students who wish more rigorous and extensive studies in their chosen discipline. The honours degree is essential as a qualification in certain fields of employment and is the essential or most desirable preparation for those intending to pursue graduate studies or professional training. The programs of studies in Honours are carefully prescribed and are given close supervision by the departments responsible for the major subjects or fields of study. The student in Honours must show competence in independent work and in small groups. Opportunity is provided for the student to read widely beyond as well as within his particular field of honours study.

Additional Admission Requirements

Admission to Honours will be granted only with the consent of the department in which the major subject is taken and with the approval of the Committee on Honours. Students with at least a 65% average in Senior matriculation or equivalent or 60% average in the Carleton Qualifying University year, and 60% or better in the honours subject, may be enrolled in Honours in the First year. With the permission of the department concerned, such students may take six courses as prescribed under the separate Divisions below. (See p. 47 for general regulations on Honours Standing).

Length of Course. Candidates for a degree with Honours will ordinarily take twenty-five courses in five years if admitted by Junior Matriculation, or twenty courses in four years if admitted by Senior Matriculation. With the permission of the department or departments concerned, it is possible for a candidate of exceptional ability to complete an Honours program in certain fields in three years from Senior Matriculation by taking six courses in each winter session and one in each of the summers (if necessary, completing a graduation essay or thesis where required in the summer of the graduating year).

Course Selection. A candidate for Honours must choose a major subject or an approved combination of subjects, normally before entry to the Second year. Details of honours courses may be found below under the respective departmental programs.

Students wishing to qualify for entry to the Ontario College of Education in the course leading to the High School Assistant's Certificate Type A should consult the Registrar and the appropriate department regarding course selection.

Programs of Study

1) Honours programs in the Humanities

At present Honours are available in Classics, English, French, German, History, Mathematics, Philosophy, Russian, and Spanish. Certain programs of combined Honours may be arranged by permission of the departments concerned.

The First year Honours prescription consists of the First year of the B.A. degree program, with the option of a sixth course to be chosen in consultation with the department concerned.

2) Honours programs in the Social Sciences
At present Honours are available in Economics, Geography, History, Mathematics, Political Science, Psychology, Public Administration, and Sociology. Combined honours programs are also available.

The course pattern for entrance into First year Honours in the Social Sciences is as follows:

4 of: Anthropology 54.110
       Economics 43.100
       Geography 45.230
       History 24.112 or 24.115
       Political Science 47.100 or 47.101
       Psychology 49.100
       Sociology 53.100, 53.101 or 53.102

1 of: English 18.100, 18.101 or 18.102 ⎤ both to be taken
       Philosophy 32.100   ⎦ before graduation

1 of: a First year language course   ⎤ two to be taken
       a First year science course   ⎬ before graduation
       a First year mathematics course ⎦

3) Honours Program in Soviet and East European Studies (this is fully described on p. 66).

An Honours program in Journalism, leading to the degree of Bachelor of Journalism with Honours, is also available. (For a description of this program see p. 59.)

School of Commerce

Director of the School: To be appointed

Committee of Management:
G. C. Merrill, Associate Dean, Division II, Faculty of Arts
T. N. Brewis (Economics)
R. Caterina (Accounting)
D. K. Dale (Mathematics)
D. M. Fraser (Public Law)
W. I. Gillespie (Economics)
K. A. J. Hay (Economics)
W. R. Scott (Accounting)

Bachelor of Commerce
Candidates for the Bachelor of Commerce degree are required to complete a four year course of studies after Senior Matriculation.
The Commerce program is designed to provide a broad foundation in academic disciplines underlying business and economic affairs in general, and to permit a measure of concentration in one of the following fields: Economics, Accounting and Finance, Quantitative Methods, or Labour and Industrial Relations. Conversion of Commerce to an honours program is under consideration. Students entering or in course should consult the Secretary of the School in September, 1968.
The program is offered in the evening as well as the day but each student must spend a minimum of one year as a full-time student in the day division.

Admission Requirements
To the *Qualifying University* year:
The same as required for admission to the Bachelor of Arts degree (see p. 49).

To the *First year*:
a) Completion of Qualifying University year, *or*
b) Ontario Grade 13, or equivalent standing, with a 60% general average in the following subjects:
1. English
2. A language other than English
3. Mathematics A, or Mathematics A and B or two or three of Algebra, Geometry, Trigonometry. (Any offering or combination of offerings in Mathematics will count only as one subject.)
4. One option chosen from:
History
Geography
A second language
A science
The above requirements apply to students who take Grade 13 in one year; students spending two years in Grade 13 must present *five* subjects.
Applicants from other provinces must present acceptable equivalent certificates generally required for admission to universities in their own provinces.
All applicants must take Scholastic Aptitude Tests (verbal and mathematical) of the Ontario Institute for Studies in Education or the College Entrance Board examinations.

Second and Later Years:
Applications for admission to the Second or later years will be governed by the arts requirements as stated on p. 50. Advanced standing for studies undertaken elsewhere will be granted only for those subjects which are recognized as the equivalent of subjects offered at Carleton University.

Course Requirements

Length of course. Candidates for the Bachelor of Commerce degree must take a total of 25 courses after Junior Matriculation or 20 after Senior Matriculation, selecting one of the fields of concentration listed below. See also Course Load, p. 40

Course Selection. Courses will be selected from those listed under Details of Courses, p. 98, as follows:

Qualifying University Year
1. English 18.010
2. French 20.010 or a course numbered between 010 and 099 in another language
3. Mathematics 69.010
4. A science: Chemistry 65.010, Physics 75.010, Geology 67.100, or Science 60.100
5. History 24.010, or another language, or another science

First Year
1. Economics 43.100
2. Accounting 41.100
3. English 18.100 or 18.101 or 18.102
4. Mathematics 69.100 or 69.101
5. One approved option

Second to Fourth Years

Fields of Concentration

	Economics	Accounting and Finance	Quantitative Methods	Labour and Industrial Relations
II	Economics 43.200 or 43.210	Economics 43.200 or 43.210	Economics 43.200 or 43.210	Economics 43.200 or 43.210
	Economics 43.220	Economics 43.220	Economics 43.220[1]	Economics 43.220
	Accounting 41.200	Acounting 41.200	Accounting 41.200	Accounting 41.200
	A course in law	Public Law 51.251	Mathematics 69.201 or Mathematics 69.205* and 69.245*	Sociology 53.100
	One approved option	One approved option	One approved option	One approved option
III	Economics 43.200 or 43.210	Economics 43.200 or 43.210	Economics 43.200 or 43.210	Economics 43.200 or 43.210
	Economics 43.225 or 43.325	Economics 43.225 or 43.325	Economics 43.225 or 43.325	Economics 43.225 or 43.325 or Sociology 53.360
	One additional course in Economics	Accounting 41.365	Accounting 41.365	Two courses to be chosen from:
	Two approved options	Accounting 41.340 or any two of Accounting 41.301*, 41.306*, 41.325*, 41.326*.	A course in law	Accounting 41.365
		One approved option	One approved option	Sociology 53.245
				Psychology 49.340
				Psychology 49.210
				One approved option

[1]With permission, a student may take a course in statistics in the Mathematics department in lieu of Economics 43.220, if he is taking the Quantitative Methods field.

IV One category 4	Economics 43.410	Economics 43.400	One category 4
Economics course	Accounting 41.400	Economics 43.405	Economics course
A further course in Economics at the 400 level. Three approved options.	Economics 43.350 Two approved options	One approved course in Mathematics Two approved options	Economics 43.355 Public Law 51.452 Two approved options of which one must be in Sociology

Each student in Commerce IV must take at least one 400-level course involving a substantial research paper.

A minimum of four courses outside the Departments of Economics and Accounting, Mathematics, and Public Law must be taken in the Faculty of Arts before graduation. Of these not more than three may be at the 100 level. At least one must be in Political Science, Sociology or Psychology.

Students who, after achieving the Bachelor of Commerce degree, intend to proceed to professional accounting qualifications—Chartered Accountant (C.A.), Certified General Accountant (C.G.A.), or Registered Industrial and Cost Accountant (R.I.A.) —should consult one of the Professors of Accounting before entering the Third year of the Commerce course.

Standing
In addition to obtaining the averages required in the general regulations (p. 40) students entering Second year must achieve 60% or better in each of Accounting 41.100 and Economics 43.100. To proceed into subsequent years and qualify for graduation students must each year obtain 60% or better in each of two honours courses.

In addition, candidates must be recommended for graduation by the School of Commerce.

School of Journalism

Director of the School: T. Joseph Scanlon, B.J., D.P.A., M.A.

Bachelor of Journalism (Qualifying and First year offered in both day and evening divisions; remaining years offered mainly in the day division).

The place of the journalist in society has been profoundly affected by the events of recent decades. The revolution in communication and transportation has enormously extended the reach of every community. The rise in literacy and the extension of democratic government has greatly increased the potential audience. The increasing complexity of life demands a more sophisticated approach to reporting and editing. More 'depth' reporting, more explanation, and more interpretation are required. The new media enrich the possibilities for vivid and effective reporting. All these changes emphasize the rising importance of the reporter, who must serve as "eyes and ears of the world".

The new age of technology needs technicians and technologists to serve it. Without them the reporter and editor will be ineffective. But the primary task of the journalist is another matter. What is wanted today is the skilled investigator, the intelligent interpreter, and the able communicator, in any medium. The world of journalism needs a constant flow of honest and alert young people with wide interests and a zest to find out what is going on in the world. These young people require a first-rate education, coupled with sufficient training in the primary skills to enable them to move easily and effectively into the various regions of modern journalism.

For these reasons the courses in Journalism at Carleton University emphasize liberal scholarship and basic skills. We assume that there are few practical applications of a specialized nature which cannot be subsequently acquired in a few weeks of actual work. While an array of "shop" courses in practical vocational training might appear to give more immediately useful crafts to the prospective journalist, it is contended that no amount of "shop" training will carry a "cub" far if he lacks a broad background of liberal education and the intelligence to grasp and report the complex phenomena of modern society.

The opportunities in the national capital for the training of newspapermen and women are exceptional. The members of the parliamentary press gallery and staffs of the Ottawa news media, the press attachés of diplomatic missions, top executives in the field of broadcasting, the public information officers of government departments, and headquarters personnel of national associations are among the resources from which Carleton University can draw for guest lecturers and teaching material. Ottawa is a repository and bureau of information upon almost every conceivable national and international topic. Residence in the national capital can of itself be an education to anyone who plans to make journalism his or her career.

Admission Requirements

To the Qualifying University year of the course leading to the Bachelor of Journalism degree:

Requirements are the same as those for admission to the Qualifying University year of courses leading to the Bachelor of Arts degree (see p. 49).

To the First year of the course leading to the Bachelor of Journalism degree:

a) Completion of Qualifying University year, *or* b) Ontario Grade 13, or an equivalent certificate, with a 60% general average in the following subjects:

1. English Composition and Literature.
2. A language other than English.
3., 4. Two options, chosen from History, Geography, a second language, a science, or Mathematics A or Mathematics A and B or two or three of Algebra, Geometry, Trigonometry. (Any offering or combination of offerings in Mathematics will count only as one option.)

Students who are registered in Ontario Grade 13 for more than one year must present *five* subjects for admission.

All applicants will be required to present the results of the Scholastic Aptitude Tests (Verbal and Mathematical) of the Ontario Institute for Studies in Education or the College Entrance Examination Board.

See also p. 39, Credit for Senior Matriculation Subjects.

c) To the Second and Third years of the course leading to the Bachelor of Journalism degree:

Undergraduates applying for admission to advanced standing with allowances on credits gained at their original college or university may be admitted to the Second or Third year, if their academic record is accepted as at least equivalent to the completion of the two previous years of Journalism in Carleton University. Normally, such applicants should offer standing in at least two of the following subjects in their previous work: Canadian History, Psychology, Economics, Political Science. Credit for courses previously taken will be arranged on application, subject to the stipulation that a minimum of a full year's work of at least the last five courses must be taken at Carleton University in order to qualify for the Bachelor of Journalism degree.

Note: Journalism students are urged to become reasonably proficient on the typewriter as soon as possible. All assignments in the professional journalism courses will be done by typewriter.

Course Requirements

Length of Course. Candidates for the Bachelor of Journalism degree must take a total of twenty courses in four years if admitted by Junior Matriculation, or fifteen courses in three years if admitted by Senior Matriculation.

Course Selection. The course leading to the degree of Bachelor of Journalism will consist of subjects selected from those listed under Details of Courses, as follows:

Qualifying University Year

1. English 18.010 (English Literature and Composition).
2. French 20.010 (Readings in Modern French).
or a course numbered between 010 and 099 in another language.
3. Mathematics 69.010.
or Latin 16.010 or another approved language course.
4. A science: Biology 61.100 or Chemistry 65.010 or Physics 75.010 or Geology 67.100 or Science 60.100.
5. History 24.010 (Main Directions in Modern History).

First Year
1. English 18.100, 18.101, 18.102, or 18.165.
2. A further course in the language taken in Qualifying year or in Grade 13.
3. An approved course in History.
4. Philosophy 32.100, 32.105, 32.110, 32.120 or Humanities 10.100 or Religion 34.100—one of which must be taken in Second year if not in First; or Psychology 49.100 (Introductory Psychology).
5. Economics 43.100 (Principles of Economics) or Political Science 47.100 (Introduction to Political Science) or Sociology 53.100 (Introduction to Sociology).

Second Year
1. Journalism 28.210 (Introduction to Journalism).
2. Journalism 28.220 (Fundamentals of Reporting).
3. An approved course in Canadian History; normally History 24.230.[1]
4. An approved option.[2]
5. An approved option.[2]

Third Year
1. Journalism 28.330 (Editing).
2. Journalism 28.340 (Interpretative Reporting).
3. Journalism 28.350 (Career Seminar in Journalism).[3]
4. An approved option.[2]
5. An approved option.[2]

Fourth Year
1. Journalism 28.490 (Honours tutorial)
2. Journalism 28.498 (Honours Research)
3. An approved option.[4]
4. An approved option.[4]
5. An approved option.[4]

Standing
A candidate for the B.J. degree must have at least 60% level standing in his Journalism courses, and be recommended for graduation by the School of Journalism. If after the regular examinations in any year a student is below that standard, he is advised to raise his grades in some subjects by writing special supplemental examinations. Students may not continue into Third year without satisfactory standing.

Bachelor of Journalism with Honours
The degree of Bachelor of Journalism with Honours is available to those students who are capable of and do above average work and wish to broaden their background and do more advanced study in one particular field of journalism.
Students in Honours may also combine some specialized area of study such as any field in Arts or Commerce, Engineering or Science with the basic Journalism program in order to prepare themselves for writing or editing in a specialized area.

[1] A student who proposes to practice Journalism in another country may be advised to choose a different History course.
[2] The subjects which will be recommended to students for their choice of options include: Political Science, Economics, Sociology, Philosophy, Canadian Geography, History, English, Social Psychology, Modern languages.
[3] Honours students will not take this course.
[4] These options must complete a second field of study.

Length of Course. Candidates for a degree with Honours will ordinarily take twenty-five courses in five years if admitted by Junior Matriculation, or twenty courses in four years if admitted by Senior Matriculation.

Candidates who wish to complete a four years Honours degree in Journalism must meet the general admission requirements described on page 47, or meet the special admission requirements described below:

The normal requirements for honours students are the same as for pass students in the Qualifying, First and Second years, but in the Third year a student in Honours must take Journalism 28.330 and Journalism 28.340 and a minimum of three approved options as well as two approved seminars. In the Fourth year, students in Honours will take Journalism 28.490 and Journalism 28.498 and three approved options. A student in Honours must take at least four of his courses outside of Journalism in one declared field with at least one of these courses at the Third year level or equivalent or higher. A combined Honours program may be worked out with any other department or faculty if the other department or faculty approves.

Students who fail to obtain honours standing in the Third year will be able to receive a pass degree providing they have completed their Third year's work in Journalism and have obtained satisfactory standing in their optional subjects.

Students who enter Carleton in the First year of any faculty other than Journalism (Science or Engineering) may be admitted to the Second year Honours in Journalism, provided they have at least a 71% overall average in First year (or equivalent). These students may proceed to a Bachelor of Journalism with Honours degree by taking the six courses in Journalism required of honours students and combining these with courses in their initial field of study approved by the School of Journalism in consultation with their other department or faculty.

Graduate Division

The holder of a Bachelor's or Master's degree in Arts, Science, or Commerce may be permitted to enroll in the Graduate Division of the School of Journalism and, if his or her background has reached the required standard, may qualify for the degree of Bachelor of Journalism in one academic year of five courses. If the background is insufficient in the social sciences or humanities, one or more additional credits may be required for the degree.

The one-year program will normally consist of the following five subjects:
1. Journalism 28.410 (The Press in Modern Society).
2. Journalism 28.430 (Editorial Practice and Policy).
3. Journalism 28.440 (Reporting and Interpreting the News).
4. Journalism 28.460 (Public Issues and Problems).
5. An approved option from the Social Sciences or Humanities.

Students in the Graduate Division may take part in the workshop sessions in Journalism 28.350. Arrangements will be made for apprenticeship assignments to supplement such practical experience as graduate students may already possess. Please note the reference above to proficiency in typewriting, and the paragraph relating to standing and grades. A grade of 60% or higher must be obtained in each of the five courses required in the one-year program for graduates.

School of Public Administration

Director of the School:
R. Oliver MacFarlane, M.A., PH.D.

Advisory Council
R. D. Boyd, Director, Personnel Branch, Department of Veterans Affairs
R. B. Bryce, Deputy Minister, Department of Finance
F. G. Davidson, President, Canadian Broadcasting Corporation
J. Y. Harcourt, University Liaison Officer, Public Service Commission
E. F. Sheffield, Executive Vice-Chairman, Committee of Presidents of Provincially
   Assisted Universities and Colleges of Ontario

Davidson Dunton, President of the University
David M. L. Farr, Dean, Faculty of Arts
Gordon C. Merrill, Associate Dean, Division II, Faculty of Arts
R. Oliver MacFarlane, Director of the School
Donald C. Rowat, Professor of Political Science
Registrar of the University
A. M. Willms, Associate Professor of Political Science

The Program
The rapid growth in government services during the last half century has increased
the responsibilities and complicated the problems of public employees. The realization
has been growing, therefore, that public administrators, whether federal, provincial,
or municipal, can profit from a special type of education. Carleton University has
been attempting to meet this need by offering programs of study as preparation for
public administration.

Assisted by a $200,000 grant from The Atkinson Charitable Foundation, the School
of Public Administration was established September 1, 1953, to co-ordinate the
various programs of study and to promote further development and research in the
field. Four programs are now offered: the first leads to a Bachelor of Arts with
Honours in Public Administration; the second to an undergraduate Certificate in
Public Services Studies; the third to a graduate Diploma in Public Administration;
and the fourth to the degree of Master of Arts in Public Administration.

The Honours B.A. program is planned on the assumption that the most suitable
education for a person desiring to be a capable public administrator is broad and
general in base, with specialization at a later stage. While it is designed to be of
particular use to students contemplating careers in public employment, it also provides
a sound general education for those considering the legal profession or business.

The Certificate and Diploma programs, on the other hand, will be most helpful to
those who desire training in fields directly related to public administration. The
Certificate course is designed to encourage public servants without university training
to broaden their background. Since they are allowed degree credit for this work, they
will also be encouraged, upon its completion, to continue toward a bachelor's degree.
The graduate Diploma course, requiring more advanced studies, is available both to
public servants in the evening division and to full-time day students. The M.A. pro-
gram is offered to full-time students, but may be taken by part-time students, subject
to conditions set forth on p. 63. Some teaching fellowships are available for M.A.
candidates.

Public employees not interested in registering for studies leading to a degree, a
certificate, or a diploma should note that they may take, as *special* students, any of
the subjects listed in Public Administration programs for which they have the requisite
background. Their attention is directed also to non-credit extension courses related
to Public Administration which are offered from time to time by the University.
Details may be obtained from the Office of the Registrar.

As Carleton University is located in the capital city and enjoys close relations with many government agencies, students of public administration may profit greatly from the unique advantages thus offered. Such institutions as the Library of Parliament, The National Library, the Public Archives, the Dominion Bureau of Statistics, and the specialized libraries of the several government departments, all offer unusual opportunities for study in Ottawa. Advice and assistance are obtained from the Public Service Commission and from officials of other government departments and agencies. Experienced public administrators give lectures or lead seminar discussions from time to time.

Undergraduate Courses

Bachelor of Arts with Honours in Public Administration (Qualifying and First years offered in both day and evening divisions; last three years offered in day division only.)

Course Requirements

Candidates for the degree of Bachelor of Arts with Honours in Public Administration must satisfy all requirements for the degree of B.A. with Honours.

Course Selection. The work of this course involves prescribed studies in Political Science, History, Economics, and Public Law, and in approved options, as outlined below.

First Year

Students intending to enter Honours Public Administration in the Second year will take the Honours First year in the Social Sciences (see p. 53), or they may enter from the Pass course if at least second class standing has been obtained. They are advised, however, to include Political Science 47.100 (Introduction to Political Science) in the First year, and by the end of that year should have a reading knowledge of French.

Second Year

1. Political Science 47.210, 47.310 or 47.220
2. Economics 43.100 (Principles) or, if already taken, an option
3. History 24.230 (Canada from 1791)
4. Political Science 47.230 (History of Political Thought)
5. An approved option

Third Year

1. Political Science 47.340 (Problems in Public Administration)
2. Political Science 47.300 (Canadian Government and Politics)
   or Public Law 51.450 (Constitutional Law)
3. Public Law 51.350 (Elements) or Political Science 47.260
4. Economics 43.210 (Aggregate Economic Theory and Policy)
   or Economics 43.225 (Economic History)
   or Economics 43.325 (Economic Development of Canada)
   or Economics 43.220 (Statistics)
5. An approved option

Fourth Year
1. Political Science 47.400 (Government of Canada)
2. Political Science 47.490 (Research Tutorial)
or Political Science 47.498 (Honours Graduation Essay)
3 & 4. Two of the following:
    Accounting 41.340 (Government Accounting & Finance)
    Economics 43.440 (Public Finance)
    Political Science 47.430 (Modern Political Thought)
    Political Science 47.440 (Personnel Administration)
    Sociology 53.245 (Sociology of Work)
    Sociology 53.345 (Sociology of Power and Stratification)
    Sociology 53.350 (Political Behaviour)
5. An approved option.

Certificate in Public Service Studies (Offered in both day and evening divisions). This course is designed primarily for public employees who seek special training in public service subjects at the undergraduate level. Subjects taken for the Certificate may be credited toward a bachelor's degree, but a student must complete at least five of the subjects required for the degree after the award of the Certificate. Candidates for the Certificate, full-time, are invited to inquire about possible financial aid.

Admission Requirements
Junior matriculation; but the cases of experienced applicants without junior matriculation will be considered on their merits and the completion of certain subjects at Carleton may be required before admission. Candidates may be admitted with advanced standing, but must complete at least five courses for the Certificate in Carleton University.

Course Requirements
The following courses are required and the following order is suggested.
1. Political Science 47.100 (Introduction to Political Science)
2. Economics 43.100 (Principles of Economics).
3. History 24.230 (Canada from 1791)
or History 24.231 (History of Canada)
or History 24.325 (The Economic Development of Canada)
4. Political Science 47.340 (Problems in Public Administration)
5. Political Science 47.300 (Canadian Government and Politics)
or Public Law 51.350 (Elements of Public Law)
6. One other chosen in consultation with the Director according to the needs of the student.
Standing. A candidate for the Certificate must obtain a grade of 60% or better in at least half of the courses taken in Carleton University for the Certificate.

Discontinued Programs
Bachelor of Public Administration
Bachelor of Arts with Certificate in Public Administration.

Graduate Courses
Graduate Diploma in Public Administration (Offered in both day and evening divisions).

This course is designed for those in or planning to enter the public service who already have a university degree, but desire further training in the fields directly related to public administration.

Admission Requirements

A bachelor's degree from a recognized college or university, including (with better than average standing) the following undergraduate courses, or their equivalents:

a. Political Science 47.100 (Introduction to Political Science)
b. Economics 43.100 (Principles of Economics)
c. History 24.230, 24.231 or 24.325 (Canadian History)
d. Two other courses approved by the Director, in the social sciences or related fields. Experience in public service may be accepted in lieu of one of these two courses.

An applicant who lacks one or more of these prerequisite courses may be allowed to take one as No. 5 of the course requirements, and may make up the remainder of his deficiencies at the University. Ordinarily he would not be required to take more than two courses in addition to the requirements for the Diploma. A prospective full-time student with only one or two prerequisites to make up may be permitted to take one as an additional course during his full-time year.

Course Requirements

Five courses are required:
1. Political Science 47.340 (Problems in Public Administration)
2. Political Science 47.230 or 47.430 (Political Thought)
3. Political Science 47.400 (Government of Canada)
or Political Science 47.300 (Canadian Government and Politics)
4. Public Law 51.350 (Elements)
or Public Law 51.450 (Constitutional)
or Political Science 47.440 (Personnel Administration)
or Accounting 41.340 (Government Accounting and Finance)
5. An approved social science, preferably chosen from: Economics 43.220, 43.430, 43.440, 43.450, Public Law 51.350, 51.450, 51.550, Sociology 53.345, 53.350, 53.440, Psychology 49.340, Accounting 41.340, or the courses in Political Science.
At least one of the courses for the Diploma must be a seminar.

All five courses for the Diploma must be taken at the University. If a student has already taken one of these courses (or their equivalents) in qualifying for admission to the Diploma program, he must substitute others approved by the Director. To meet the needs of foreign students, variations from the course requirements.may be approved by the Director.

Potential Municipal Administrators should elect the following program:
1. Political Science 47.340 (Administration)
2. Political Science 47.230 or 47.430 (Theory)
3. Political Science 47.490 (Tutorial in Local Government)
or Political Science 47.498 (Research Essay)
4. Political Science 47.500 (Provincial and Municipal)
5. Public Law 51.350 (Elements)
or Political Science 47.440 (Personnel Administration)
or Accounting 41.340 (Government Accounting and Finance)
or Geography 45.420 (Urban)

Standing. All grades must be 60%, or better, with an average in the five courses of 65%.

Master of Arts in Public Administration
This program is normally offered in Day Division only, but it may be taken in Evening Division with the approval of the Director under the following conditions:
1. Admission under 'a' or 'b' below.
2. Passing a comprehensive examination prior to the conferring of a degree.
3. Completing all requirements in a period not exceeding five years.
4. Having previously completed in B.A. or graduate program at least one year of university residence.

Admission Requirements
a. A bachelor's degree, and the graduate Diploma in Public Administration with an average of 68% or better, and no course below 60%.

or

b. A bachelor's degree in any honours course requiring four years from Senior Matriculation with second-class honours or better, or a bachelor's degree and an additional year of post-graduate work with at least second-class standing. If standing has not been obtained in Introduction to Political Science, Economic Principles, Canadian History, Public Administration, and Political Theory, a student may be required to complete some or all of these courses with grades of 66% or better, prior to undertaking the course requirements listed below. A prospective full-time student with only one or two prerequisite courses to make up, may take one of these during the summer prior to entry and/or may be permitted to audit or take one as an additional course during his full-time year.

If a student is without standing in all or most of these courses he will be required to register for the Graduate Diploma. An evening student may then, upon successful completion of three of the above courses with grades of 68% or better, apply for admission to the M.A. program. (A full-time student in this category would be allowed to choose his Diploma courses so that one or two of them could count toward his M.A. Upon the successful completion of his full-time year, he could then either take the Diploma or apply for admission with advanced standing to the M.A. program, which could then be completed in the Evening Division.)

Course Requirements
1. Political Science 47.540 (Theory and Practice of Administration)
or Political Science 47.545 (Comparative Public Administration)
2. Public Law 51.550 (Administrative) (This course must be elected if not previously taken.)
or Political Science 47.440 (Personnel Administration)
3. Political Science 47.400 (Government of Canada)
or Political Science 47.500 (Provincial and Municipal Government)
or Political Science 47.510 (The Political Process in Canada)
4. (a) An approved option, and either
Political Science 47.590 (Directed Study in a Selected Field)
or Political Science 47.598 (Research Essay)
or
(b) Political Science 47.599 (Thesis, equivalent to 2 courses)
Standing. A grade of 66% or better must be obtained in each course counted for the M.A. degree, with an average of 68%. All students must pass an oral examination.

Doctor of Philosophy
See program outlined under Political Science, and note language requirement.

Soviet and East European Studies

Chairman: John W. Strong, B.A., M.A., PH.D.

Committee
David M. L. Farr, Dean, Faculty of Arts
Gordon C. Merrill, Associate Dean, Division II, Faculty of Arts
Glynn R. Barratt (Russian)
Adam Bromke (Political Science)
Richard L. Carson (Economics)
R. Carter Elwood (History)
Teresa R. Harmstone (Political Science)
Carl M. McMillan (Economics)
George Melnikov (Russian)
George Roseme (Political Science)
Emilie Stichling (Russian)
Philip E. Uren (Geography)
Paul Varnai (Russian)

Associates
Mr. A. M. Baldwin — Department of Trade and Commerce
Dr. Constantine Bida — University of Ottawa
Mr. Ivor Bowen — Ottawa
Dr. Stanley Haidasz — House of Commons
Dr. Godfrey Hearn — Department of External Affairs
Dr. T. P. Jost — University of Ottawa
Dr. Vladimir J. Kaye — Ottawa
Mr. J. B. Seaborn — Department of External Affairs
The Hon. Paul Yuzyk — The Senate
Mr. Lubor Zink — Ottawa

The expanding public interest in the USSR and East Europe, as well as the growing demand for specialists in this area in public service, foreign trade, journalism and teaching, led in 1963 to the establishment of an interdepartmental committee to foster Soviet and East European studies at Carleton University. The proximity of the University to several government libraries with a wealth of material relating to the USSR and East Europe and the presence of embassies of these countries in Ottawa make Carleton a suitable centre for instruction and research in this field.

The Committee, composed of representatives of five departments in the humanities and social sciences, offers an Honours degree program in Soviet and East European Studies and also sponsors public lectures, conferences, seminars, and extension courses relating to the Soviet Union and the Eastern European countries, and promotes exchanges with universities in the USSR and East Europe.

The program of Soviet and East European Studies works in close association with Carleton's School of International Affairs on problems of East-West Relations.

Honours Program
The objective of the Honours program is to equip students with the indispensable linguistic tools and to provide, through an interdisciplinary approach, an integrated knowledge of the cultures, historical developments and contemporary social, economic and political problems of the people of the area. The program leads to the degree of Bachelor of Arts with Honours in Soviet and East European studies.

A combined Honours degree between Soviet and East European Studies and the School of Journalism is offered to interested students. Course requirements for this degree are planned by the Chairman of the program in consultation with the Director of the School of Journalism, and are designed to accommodate the students' interests and needs.

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Admission Requirements

Admission to the program must be approved by the Committee on Soviet and East European Studies and by the Faculty of Arts Committee on Honours. Students with at least a 65% average in Senior matriculation or a 60% standing in the Carleton Qualifying University year, may be enrolled in the program in the First year. With the consent of the Committee, students may also enter the program in their later years, providing they have maintained honours standing and have completed the program's course requirements to that point.

Course Requirements

Candidates for a degree in Soviet and East European studies will take twenty courses in four years. All course programs must be approved by the Committee. The course program recommended for the first two years is designed to provide a foundation for a concentration on the Soviet and East European area in the third and fourth years of study.

The following courses are obligatory:

a) Russian 36.015, 36.100, 36.201 and 36.250 (On approval of the Committee, candidates with a prior knowledge of the Russian language may be excused from part or all of this requirement, and will be asked to substitute more advanced courses offered by the Department of Russian).

b) A First year science or mathematics; English 18.100 or 18.101; and Philosophy 32.100 or Humanities 10.100. (These three courses should, if possible, be taken in the First year).

c) At least two of the following courses: History 24.100 or 24.112; Economics 43.100, and Political Science 47.100. (To be taken in either the First or Second year).

d) Five courses (given in no less than three different departments) are to be selected from among the following:
Russian Literature in Translation (Russian 36.260) This course is an option for Soviet Studies majors, but will not be credited toward a degree in Soviet Studies.
Russian: Advanced Composition and Conversation (Russian 36.301)
Russian Poetry (Russian 36.320)
Soviet Russian Literature (Russian 36.330)
Russian Drama (Russian 36.340)
The Russian Novel (Russian 36.350)
Russian Literature up to Pushkin (Russian 36.360)
Russian Tutorial (Russian 36.491)
Geography of the Soviet Union and Eastern Europe (Geography 45.360)
History of Russia and the USSR (History 24.260)
History of the USSR (History 24.360)
History of Eastern Europe (History 24.365)
Modern History of the Far East (History 24.385)
Seminar in Russian and Soviet History (History 24.460)
Economics of Planning (Economics 43.366)
The Soviet Economy (Economics 43.370)
Comparative Political Economy (Economics 43.470)
Soviet Government and Politics (Political Science 47.320)
Modern Political Thought (Political Science 47.430)
Problems in Communist Politics (Political Science 47.515)
Soviet Foreign Policy (Political Science 47.570)

Note: Not all courses listed above are offered in any given year and not all combinations of courses are possible.

e) Five additional courses are to be selected in consultation with the Chairman of the program from the offerings of the Departments of Economics, Geography, History, and Political Science.

f) A graduating essay which will carry the weight of a further course (to be written in the Fourth year).

Standing
Students must maintain honours standing as prescribed by the general requirements.

Comparative Literature

Chairman of the Committee: Eva M. Kushner, M.A., PH.D.

Committee:
Moray St. John Macphail, Dean of the Faculty of Graduate Studies
David M. L. Farr, Dean of the Faculty of Arts
David George Beer (Classics)
Jutta Goheen (German)
Thomas Henighan (English)
Benjamin W. Jones (English)
Wladimir Krysinski (French)
Pierre Laurette (French)
Robert L. McDougall (Institute of Canadian Studies)
Christopher Marsden (Spanish)
George Melnikov (Russian)
Ernst M. Oppenheimer (German)
F. Ellenor M. Swallow (Classics)
James S. Tassie (French)
Fernando de Toro-Garland (Spanish)
Guest Lecturer, Summer 1968: A. Dabezies, S.J.

The purpose of Comparative Literature is to study literature in its international context, and to relate and compare literary phenomena usually studied in isolation because of linguistic barriers and the traditional departmental dividing of academic disciplines. Thus, taking into account the interrelatedness of all humanistic studies such as the various literatures but also philosophy, psychology, sociology, the visual arts and history, "comparatists" view literary creation within the total complex evolution of world literature. The historical flow of literary movements and ideas across national and linguistic borders, literary archetypes, the role of folklore and myth in literature, recurrent problems of literary theory, consideration of the less well known literatures of the world, these are some of the objects of Comparative Literature studies.

In the Spring of 1966 the Graduate Faculty approved the creation of a Comparative Literature Committee entrusted with the gradual development of an inter-departmental program which would eventually offer the M.A., the Ph.D. and research opportunities in a discipline hitherto untouched by most Canadian universities.

While the Committee makes available some of its courses as options for qualified undergraduates and graduates registered in other disciplines and appreciative of the broader perspectives offered by Comparative Literature, its main purpose is to provide courses for graduate students wishing to specialize in Comparative Literature. Beginning in 1968, students may register for a Master's degree in Comparative Literature.

Admission Requirements
a) Students registered in Language Departments, wishing to follow courses in the program: proficiency in the language(s) required for each course taken.
b) M.A. students possessing a Pass B.A. or its equivalent in a major literature: proficiency in at least one language other than English, and a reading knowledge of a second language other than English, from among those languages currently taught at Carleton. If a student lacking reading knowledge of the second language is admitted into the program, he will be required to make up this deficiency.
c) M.A. students possessing an Honours B.A. or its equivalent in a major literature: proficiency in one language other than English and reading knowledge of a second language other than English, chosen from those currently offered at Carleton, or approved by the Committee.

Course patterns

A student in the Qualifying year of the M.A. should take a 400 level course in Comparative Literature and literary courses in at least two literatures. The two remaining options could include another Comparative Literature course or other relevant courses.

A student in the M.A. year must take five courses as follows:

a) Program with thesis
      i) Comparative Literature
      ii) option (or Comparative Literature 17.401 if not already taken)
      iii) option
    iv & v) thesis

b) Program without thesis
      i) Comparative Literature
      ii) Comparative Literature
      iii) option (or Comparative Literature 17.401 if not already taken)
      iv) option
      v) option

Comparative Literature 17.401 must be included in either program.

Each individual program must be approved by the Committee.

Course topics in the past have included: Source and Influence, Goethe-Rousseau, The Don Juan theme in World Literature.

Courses offered in 1968-69.

Comparative Literature 17.401, Seminar on Literary Theory

Topic for 1968-69: *Comparative Methods and their application; problems in Renaissance Literature*
Open to honours students in Classics, English, French, German, Italian, Russian and Spanish and to students of the Institute of Canadian Studies. Conducted in English.
Day or Evening Division: 1968-69 (two hours a week to be arranged).
Eva Kushner and C. Marsden

Comparative Literature 17.467, Special topics in Modern Fiction

Detailed examination of selected texts in the light of important problems in modern fiction, and especially that of the relationship of narrative structure to the portrayal of psychic life, the irrational, and the "unmotivated act". In 1968-69 the course will examine the works of: Dostoievski, Hamsun, Hesse, Svevo, D. H. Lawrence, Gide, Butor, Natalie Sarraute and Robbe-Grillet.
Prerequisites: One language other than English, preferably French, or Russian, or German, or Italian; permission of the instructor.
Day Division: 1968-69 (three hours a week).
T. Henighan with R. Galliani, W. Krysinski and P. Varnai

Comparative Literature 17.530, Literary Archetypes

Topic for Summer 1968: *Faust in World Literature*
The course will be conducted in English. The readings will be done, as much as possible, in the original languages.
Summer: 1968 *Evening Division* (two lectures a week).
A. Dabezies

Comparative Literature 17.561, The Development of the Medieval Courtly Epic

Perceval, Parzival, Sir Gawain and Morte d'Arthur. A study of textual problems, the development of themes and motifs, as well as an analysis of medieval style.
Prerequisite: At least one of: Old French, Middle High German or Middle English. Permission.
Day or Evening Division: 1968-69 (three hours a week).
Jutta Goheen, Maureen Hanna and B. Roy

Comparative Literature 17.599

M.A. Thesis
Members of the Committee

Faculty of Science

Dean of the Faculty: Herbert H. J. Nesbitt, M.A., PH.D., D.SC., F.L.S.

Admission Requirements
To the Qualifying University year of courses leading to the Bachelor of Science degree:
Requirements are the same as those for admission to the Bachelor of Arts degree (see p. 49), or by Mature Matriculation as prescribed above (p. 50).

To the First year of courses leading to the Bachelor of Science degrees:

(a) Completion of the Qualifying University year with an average of 60% or better in mathematics and science subjects taken, *or*

(b) The successful completion of four Grade 13 subjects with a 60% general average, from the categories listed below:

1. Mathematics A and B (or algebra, geometry and trigonometry).
2, 3. Two experimental sciences chosen from biology, chemistry and physics.
4. An option chosen from English, history, geography, a language, or a third science.

Students who are registered in Ontario Grade 13 for more than one year must present *five* subjects for admission.

Prospective students are asked to note that, while only a 60% general average is required for admission, they should have at least third class honours in the mathematics and science subjects offered.
Applicants from other provinces must present acceptable equivalent certificates generally required for admission to universities in their own provinces.
All applicants will be required to present the results of the Scholastic Aptitude Tests (Verbal and Mathematical) of the Ontario Institute for Studies in Education or the College Entrance Examination Board.

To the Second or subsequent years of courses leading to the Bachelor of Science degree:
Applications for admission to the Second or subsequent years will be evaluated on their merits and advanced standing granted for studies undertaken elsewhere only when these are recognized as the eqivalent of subjects offered in Carleton University. Work taken in the Faculty of Engineering may be counted towards a degree in Science should the student wish to transfer from the Faculty of Engineering at the end of his First or Second year.
Every student will be required to complete at least his last five courses in Carleton University.

Course Requirements

Bachelor of Science
Length of course. Candidates for the B.Sc. degree program will take a total of twenty courses after Junior Matriculation, or fifteen after Senior Matriculation. Candidates for the B.Sc. degree with Honours will normally take an additional five courses in their Fourth year. (See below). See also Course Load, p. 40.

Course selection. The B.Sc. program is designed to provide specialization in one field of study called a "major". The choice of the major will be made after successful completion of the First year and in consultation with the Department concerned. In addition, a candidate must fulfil the specific requirements of his Department and take such ancillary work as his Department may prescribe.
Candidates wishing to change their major field of study may do so only with the approval of both departments concerned.

Standards of Entry to a Major Subject: To be eligible for promotion to Second year and entry to a major program a student (full or part-time) must have satisfied the University regulations set forth on p. 41 and have obtained at least two grades of 60%, one of which must have been in the subject in which he intends to major. His program must be approved by the department in which he intends to major.

Subjects in which majors may be taken are: Biology, Chemistry, Geology, Mathematics, Physics.

Courses will be selected from those listed under Details of Courses, p. 98 as follows:

Qualifying University Year
1. 2. Mathematics 69.010 and 69.011
3. 4. Two of Chemistry 65.010, Physics 75.010, Geology 67.100, Biology 61.100
5. An option chosen from English, History, a language or a third science.

First Year
1. One of: Classical Civilization 13.200 or 13.201, English 18.100 or 18.101, Philosophy 32.100, Psychology 49.100 or Humanities 10.100, or any other course in the humanities or social sciences numbered 100 or higher, chosen with the approval of the department in which the student intends to major.
2. Mathematics 69.100 or Mathematics 69.101 if approved by the department in which a student wishes to major.
3. ⌈ Three of:
4. ⎨ (a) Biology 61.100
5. ⌊ (b) Chemistry 65.010 or 65.100
     (c) Geology 67.100
     (d) Physics 75.010, 75.100 or 75.105

Second and Third Years
A total of ten courses, five in each year: normally at least four more courses in the student's major, at least two science courses above the First year in a department or departments other than the major department, and at least one course each year chosen from subjects other than the natural sciences and mathematics. The program of each student in the Second and Third years is under the direct supervision of a full-time member of the department in which he takes his major.

Available Evening Courses. In several departments, most of the more advanced courses will normally be given, in whole or in part, in the day division only. Evening division candidates will therefore have to arrange to take certain of their major courses in the daytime. Candidates are advised to consult their major departments as early as possible to arrange their programs.

Bachelor of Science with Honours
Subjects in which honours may be taken are: Biology, Chemistry, Geology, Mathematics, Mathematics and Physics, Physics, and Psychology. Note: Candidates for the Bachelor of Science degree with Honours in Psychology should elect Psychology 49.100 as the option chosen from category (1) in the First year.

The degree of Bachelor of Science with Honours in a particular discipline is designed for those students who wish to deepen and extend their studies in one particular field for the purpose of preparing themselves for the graduate schools, or for entrance to the Specialists' Certificate of the Ontario College of Education. It is also a desirable preparation and in many cases an essential requirement for certain fields of employment.

Length of Course. Candidates for a degree with Honours will ordinarily take twenty-five courses in five years if admitted by Junior matriculation, or twenty courses in four years if admitted by Senior matriculation. With the permission of the department or departments concerned, it is possible for a candidate of exceptional ability to complete an Honours program in certain fields in three years from Senior matriculation by taking six courses in each winter session and one in each of the summers (if necessary, completing a graduation essay or thesis where required in the summer of the graduating year).

Course Selection. A candidate for Honours must choose a major subject or an approved combination of subjects, normally before entry to the Second year. Details of honours courses may be found below under the respective departmental programs. Students wishing to qualify for entry to the Ontario College of Education in the course leading to the High School Assistant's Certificate Type A should consult the Registrar and the appropriate departments regarding course selection.

In the course prescriptions, the special requirements of each of the five departments in science is set forth in detail and students who wish to take advantage of the Honours program are advised that they must consult with the Chairman of the Department of their choice.

Students may enter Honours in science from Senior matriculation with at least 65% average or by transfer from the First year course with at least third class standing (see p. 47) and the recommendation of their department. The First year of the Honours science program consists of the present First year of the general B.Sc. program with the option of a sixth course, which may be chosen in consultation with a member of the major department.

Language requirement. Before graduation, the candidate for the B.Sc. degree with Honours will be required to show that he has a reading knowledge of French, German, or Russian (or two of these, at option of the major department.)

Faculty of Engineering

Dean of the Faculty: John Ruptash, B.SC., M.A.SC., PH.D.

Bachelor of Engineering (offered in the Day Division only)

The Bachelor of Engineering degree is awarded on successful completion of a four year program of studies. In the first three years the emphasis is on mathematics, physics, chemistry, and the engineering sciences. The following options or fields of study are offered in the fourth year of the B.Eng. curriculum: Civil Engineering, Electrical Engineering, and Mechanical Engineering.

The engineering programs of study offered at Carleton University meet the academic requirements for professional engineering registration by the Association of Professional Engineers of the Province of Ontario. The programs of study also meet the academic requirements for professional registration in the provinces of Alberta, British Columbia, Manitoba, Newfoundland, New Brunswick, Quebec, and Saskatchewan. The degree of Bachelor of Engineering in Electrical Engineering satisfies the educational requirements of the Institution of Electrical Engineers of London, England, and carries complete exemption from the Institution's Examinations.

Admission Requirements

(a) *First Year*—For admission to the First year of the program of studies leading to the Bachelor of Engineering degree, an applicant must have passed the Qualifying University year examinations at Carleton University (see p. 73) with a grade of 60% or better in Mathematics, Chemistry and Physics; *or* the Ontario Senior Matriculation (Grade 13) examinations or equivalent examinations of other recognized examining bodies in the following subjects, with an *average of at least 60%*:

1. Mathematics A and B
2. Physics
3. Chemistry
4. One of: English (see footnote page 76,) a language other than English, Biology, Geography, History.

Students who are registered in Ontario Grade 13 for more than one year must present *five* subjects for admission.

Applicants from other provinces must present acceptable equivalent certificates generally required for admission to universities in their own provinces.

All applicants are required to present the results of the Scholastic Aptitude Test (verbal and mathematical) of the Ontario Institute for Studies in Education or the College Entrance Examination Board.

(b) *Advanced Standing*—Applications for admission with advanced standing to the second or subsequent years of the program leading to the Bachelor of Engineering degree will be evaluated on an individual basis. Advanced standing for subjects completed at another university or college will be accepted only if the subject is recognized as the equivalent of a corresponding subject offered at Carleton University. Transfer of credit for the academic work of the First year of an Engineering program completed at another university or college will be considered provided the weighted average is at least 60%. Transfer of credit for the work of the Second and Third years will be considered provided the weighted average is at least 62% and 64%, respectively.

Course Requirements

Candidates for the Bachelor of Engineering degree are required to complete a prescribed program of studies covering four years after Senior Matriculation. The programs of study are outlined in pp. 76-79. The subjects comprising the programs of study are described under Details of Courses, pp. 98-309.

A candidate for the Bachelor of Engineering degree must have at least six months of suitable practical experience in technical work. Evidence of appropriate summer employment or other technical experience must be submitted not later than October 1 on forms obtainable from the Faculty of Engineering.

All students entering the Fourth year of the Engineering program must submit a summer essay. The summer essays should be written on a topic drawn from the experience gained by the student during his summer employment and must be submitted to the Dean of Engineering on or before October 1.

In addition to the regular course requirements, candidates for the B.Eng. degree are required to attend seminars and field trips arranged specially for undergraduate students.

First Year

Subject	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Chem. 65.105 (Qualitative Analysis and Elementary Physical Chemistry)	3	3	3	3
English 18.115 (English)*	3	3	–	–
Math. 69.100 (Introductory Calculus and Algebra)	4	4	–	–
Math. 69.135 (Algebra and Geometry)	1	1	–	–
Physics 75.100 (Introductory Physics)	3	3	3	3
Eng. 87.100 (Engineering Drawing and Geometry)	1	1	5	5
Eng. 81.110 (Mechanics I)	2	2	–	–
	17	17	11	11

Students desiring an introduction to surveying may register in Eng. 84.104 as a non-credit elective.

*An applicant who is granted admission without credit in Grade 13 English, or the equivalent, may register in either English 18.010 or English 18.115 provided the grade earned in Grade 12 English is at least 70%. If the grade earned in Grade 12 English is below 70% the applicant will be required to register in English 18.010. If the grade earned in English 18.010 is 60% or lower the student will be required to select either English 18.115, 18.100 or 18.102 as the elective in the Second year program.

Second Year

Subject	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Geology 67.201 (Introductory Geology)	3	–	3	–
Math. 69.201 (Intermediate Calculus and Algebra)	4	4	–	–
Physics 75.230 (Introductory Electricity and Magnetism)	3	3	3	3
Eng. 81.211 (Mechanics II)	–	3	–	3
Eng. 81.220 (Mechanics of Materials I)	3	–	3	–
Eng. 95.265 (Computer Programming)	1	1	1	1
Eng. 86.270 (Elem. of Materials Science)	–	3	–	3
Elective (Humanity or Social Science)	3	3	–	–
	17	17	10	10

Third Year

Subject	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Math. 69.305 (Complex Variable)	3	–	–	–
Math. 69.306 (Math. Methods I)	–	3	–	–
Eng. 87.312 (Mechanics of Machines I)	3	–	–	–
Eng. 81.321 (Mechanics of Materials II)	–	2	–	3
Eng. 89.330 (Fluid Mechanics)	2	2	3/2	3/2
Eng. 90.340 (Thermodynamics)	3	–	3	–
Eng. 90.341 (Intro. to Heat Transfer)	–	2	–	3/2
Eng. 93.351 (Funda. of Electric Circuits)	3	–	3	–
Eng. 98.361 (Intro. to Electric Machines)	–	3	–	3/2
Eng. 93.357 (Electronics I)	–	3	–	3/2
Eng. 95.366 (Computer Applications)	3	–	–	–
Elective (Humanity or Social Science)	3	3	–	–
	20	18	7½	9

Fourth Year (Civil Engineering Option)

Subject	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Eng. 99.497 (Engineering Project)	—	—	4	6
Eng. 82.422 (Structural Analysis)	3	2	3/2	3/2
Eng. 82.423 (Reinforced Concrete)	—	3	—	3
Eng. 83.424 (Soil Mechanics)	3	—	3/2	—
Eng. 82.425 (Design of Structural Components)	3	—	3/2	—
Eng. 89.431 (Hydrology)	2	—	3/2	—
Elective (Engineering)*	—	2	—	3/2
Elective (Basic Science or Engineering)*	2	2	3/2	3/2
Elective (Humanity or Social Science)	3	3	—	—
	16	12	11½	13½

*Engineering electives offered: 81.411—Introduction to Solid Mechanics, 82.426—Design of Steel Structures, 82.428—Foundation Eng., 84.429—Highway Eng., 84.433—Urban Planning, 84.434—Transportation, 89.435—Fluid Machinery, 89.436—Hydraulic Structures, 86.471—Applied Materials Science.

Fourth Year (Electrical Engineering Option)

Subject	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Eng. 99.497 (Engineering Project)	—	—	4	6
Eng. 94.451 (Signal Processing)	—	3	—	—
Eng. 97.453 (Electric Transmission and Radiation)	—	3	—	3/2
Eng. 97.454 (Electromagnetic Fields)	3	—	—	—
Eng. 94.455 (Feedback Control Systems)	3	—	—	—
Eng. 93.458 (Electronics II)	2	3	3	3/2
Eng. 98.462 (Electrical Machines)	—	2	—	—
Eng. 96.468 (Solid State Electronics)	3	—	3/2	—
Elective (Basic Science or Engineering)*	2	2	3/2	3/2
Elective (Humanity or Social Science)	3	3	—	—
	16	16	10	10½

*Engineering electives offered: 90.443—Energy Conversion, 94.456—Feedback Control Laboratory, 95.466—Switching Circuits, 86.475—Electrical Materials.

Fourth Year (Mechanical Engineering Option)

Subject	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Eng. 99.497 (Engineering Project)	–	–	4	6
Eng. 87.401 (Mechanical Analysis and Design)	2	2	3/2	3/2
Eng. 81.411 (Intro. to Solid Mechanics)	2	–	3/2	–
Eng. 88.414 (Vibration Analysis)	2	–	3/2	–
Eng. 89.432 (Fluid Dynamics)	3	–	–	–
Eng. 90.442 (Applied Thermodynamics)	3	3	–	3
Eng. 90.443 (Energy Conversion)	–	3	–	3/2
Elective (Basic Science or Engineering)*	2	2	3/2	3/2
Elective (Humanity or Social Science)	3	3	–	–
	17	13	10	13½

*Engineering Electives offered: 89.435—Fluid Machinery, 88.437—Mechanics of Flight, 88.447—Heating, Ventilating and Air Conditioning, 88.452—Control Systems and Instrumentation, 94.456—Feedback Control Laboratory, 86.471—Applied Materials Science.

Promotion Requirements. The general regulations regarding failure, repetition, and probation are outlined on p. 43.

In order to qualify for promotion from one year to the next, an engineering student must have passed either the final or the supplemental examination in every subject of his program, with a weighted average of at least 58%.

To qualify for supplemental examination privileges a student must attain a weighted average of at least 54% in the final examinations.

If, after final and supplemental examinations, a student has failed to achieve standing in a subject which is a prerequisite for the course work of the following year, he may repeat the year's work or clear the deficiency as a part-time student. If the failed subject is not a prerequisite for the course work of the following year, the student may be conditionally promoted and may be permitted to repeat the failed subject as an extra subject, provided his weighted average is at least 60%.

If the academic standing of an engineering student does not meet the minimum promotion requirements, he may *either* clear his deficiency as a part-time student *or* apply to the Committee on Admission and Studies for permission to repeat the year's work. If permission is granted, he will be placed on probation for that academic year. The academic load for a repeated year in engineering must be at least the equivalent of 15 hours of lectures and 9 hours of laboratory a week or 18 hours of lectures and 6 hours of laboratory a week. Subjects in which 70% or better was obtained need not be repeated. The required subjects of the succeeding year may be included as part of a repeated year program provided 70% or better was obtained in the prerequisite subjects.

A student who fails both the regular and supplemental examinations in either Mathematics 69.305 or Mathematics 69.306 may, with the approval of his program adviser, elect another course in mathematics to complete the degree requirements.

Graduation Requirements

In order to fulfil the minimum graduation requirements for the degree of Bachelor of Engineering, a candidate must have passed all the course requirements of the first to fourth years, inclusive, with an overall weighted average of at least 60% and, in addition, must be recommended for graduation by the Faculty of Engineering.

Degrees with Distinction

Upon recommendation of the Faculty of Engineering, the notation "with High Distinction" may be made on the academic records of a candidate for the degree of Bachelor of Engineering. To receive this recommendation the candidate is expected to obtain a weighted average of at least 80% in the course requirements of the final year and, in addition, a weighted average of at least 75% in the course requirements of the first to fourth years, inclusive.

Upon recommendation of the Faculty of Engineering, the notation "with Distinction" may be made on the academic records of a candidate who achieves a weighted average of at least 75% in the final year and, in addition, at least 70% in the course requirements of the first to fourth years, inclusive.

Master of Engineering

The Faculty of Engineering offers graduate courses leading to the Master of Engineering degree in the fields of Aeronautical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, and Materials Engineering. The courses offered are described under Details of Subjects, pp. 153-168. The graduate programs in Engineering provide an opportunity for both full-time and part-time studies. Candidates who are employed on a full-time basis will normally require three academic years, or two academic years plus two summer terms, of part-time study to complete the requirements for a Master's degree. The study load of a candidate who is employed full-time is restricted to a maximum of six lecture-hours a week.

In addition to the general requirements for admission to the Faculty of Graduate Studies, as specified on p. 88, a candidate for the Master of Engineering degree is required to have strong undergraduate preparation in Mathematics and Physics. Applicants who intend to specialize in Aeronautical Engineering are expected to have studied at the undergraduate level for courses in Dynamics, Fluid Mechanics, Mechanics of Materials, Structural Analysis, Thermodynamics, Electronics, and Elementary Applied Aerodynamics. For Civil Engineering, applicants are expected to have studied at the undergraduate level in Dynamics, Fluid Mechanics, Mechanics of Materials, Structural Analysis, Reinforced Concrete, Soil Mechanics, and Foundations. For Mechanical Engineering, applicants are expected to have studied at the undergraduate level in Dynamics, Mechanics of Machines, Machine Design, Mechanics of Materials, Fluid Mechanics, Thermodynamics, Heat Transfer, Electrical Circuits and Electronics. Applicants who intend to specialize in Electrical Engineering are expected to have studied at the undergraduate level for courses in Feedback Control Systems, Electrical Machines, Electronics, Electromagnetic Field Theory, Electrical Transmission, Circuit Analysis, Electrical Transient Phenomena.

Candidates for the M.Eng. degree in Electrical Engineering may also be required to complete an orientation program in Real-Time and Hybrid Computer Programming (an introduction to the use of the PDP-8 digital computer, TR-10 analog computer and associated interfacing and peripherals) during the first term.

Courses offered by applicants as undergraduate preparation for the Graduate Program should be comparable in level and content to courses offered in the current Faculty of Engineering undergraduate curriculum. Since most graduate courses are based on the work of the senior undergraduate year, applicants should examine

carefully the descriptions of courses carrying 400 numbers in their area of interest. Detailed information regarding prerequisites to a particular course may be obtained from the Dean of Engineering.

The graduate study program in Engineering is an elective program. Candidates may select a number of courses which relate to their particular field of interest or activity. Individual programs must, however, form an integrated, balanced unit with emphasis on one, or at most two, aspects of the field of specialization. The program of studies for full-time students will ordinarily include four courses in the first term, three courses in the second term, and a thesis. The program must include at least two graduate level courses in Engineering, both terms. Each candidate will be required to take an oral examination on the subject of his thesis and related fields. The examination will be conducted by an Examining Board appointed by the Dean of the Faculty of Engineering.

All candidates are required to demonstrate, to the satisfaction of the Examining Board, their ability to solve a reasonably complex problem, related to their field of specialization, using either an electronic analog or a digital computer. The Board will accept credit in an appropriate course, or may, at its discretion, conduct an independent examination.

The thesis must represent the results of the candidate's independent research or development work, undertaken after admission to graduate standing at Carleton University. Experimental or theoretical results, previously published by the candidate, may be used only as introductory or background material for the thesis. A candidate may be permitted to carry on thesis research work off-campus providing the work is approved in advance and arrangements have been made for supervision of thesis-research activities by a faculty member of Carleton University. A part-time student may use the Faculty of Engineering laboratory facilities for on-campus thesis research and development activities. In such cases a period of not less than three calendar months of full-time University residence is required.

A candidate for the Master's degree who has, before admission, completed independent research or developmental projects of an adequate level of accomplishment, may apply to the Faculty of Graduate Studies for a waiver of the thesis requirement. Such application must be made at the time of initial registration and must be supported by copies of published reports describing the work. If the application is approved, the candidate must take five full courses or the equivalent, three of which must be graduate level courses in Engineering, to fulfil the requirement for the award of a degree without a thesis. A candidate who has been granted a waiver of the thesis requirement will be required to take an oral examination on the subject of one of his published papers and topics related to his field of specialization.

Credit for one graduate course completed with a grade of 70% or higher at another University may be offered in partial fulfilment of the requirements for award of the Master of Engineering degree, providing the course submitted for transfer credit is appropriate to the candidate's graduate program at Carleton University, and the credit for the course has been earned not more than three years prior to admission to graduate standing at Carleton. Application for transfer of credit must be made at the time of initial registration.

A member of the faculty will be associated with each degree candidate as program adviser. The candidate is required to meet his adviser during the week preceding registration to discuss and determine his program of study.

A limited number of students, who are not candidates for the Master of Engineering degree, may be admitted to each graduate Engineering course as special students. An applicant for special student status requires the consent of the instructor. This consent must be obtained no later than the week preceding registration. Special students are expected to write the regular examinations in the course and must register during the

normal registration period Credit earned as a special student cannot be counted towards the requirements of an advanced degree in Engineering.

Doctor of Philosophy in Engineering

The Faculty of Engineering offers courses of study and research leading to the degree of Doctor of Philosophy in Engineering in the fields of Aeronautical, Civil, Electrical, and Mechanical Engineering. For admission to a doctoral program an applicant must hold a Master's degree in Engineering, or its equivalent, and, by his previous program of study and scholastic record, demonstrate a capacity for advanced study and research.

Candidates are subject to the General Regulations of the Faculty of Graduate Studies, page 89, in addition to the particular requirements of the Faculty of Engineering. The program of studies must include at least two graduate courses in Engineering, and at least one advanced course in Mathematics or Physics or Chemistry or Geology, and a substantial thesis. Concurrent with preparation of the thesis a minimum period of twelve calendar months of full-time University residence is required. All candidates will be required to take a comprehensive examination which will ordinarily include both written and oral examinations. Each candidate will also be required to take a final oral examination on the subject of his thesis and related fields.

The Faculty of Engineering requires a candidate to demonstrate an understanding of a second language sufficient to support short-term residence in an area where that language is indigenous. The candidate will satisfy the language requirement in three steps.

(i) Show standing of 60% or better in a full course at the introductory level, offered at Carleton, in a language other than English, appropriate to his area of professional interest.

(ii) Demonstrate reasonable understanding, on sight, of material contained in selected samples of the daily press in that language.

(iii) Translate on sight from the language into English and from English into the language a group of technical terms appropriate to his area of professional interest selected from an assigned vocabulary of some five hundred words.

If a candidate whose mother tongue is not English elects his mother tongue as the second language, he will be required to demonstrate a high degree of proficiency in translation of a wide range of general engineering literature.

The Graduate Seminar

Graduate Seminars are held throughout the Fall and Spring terms. Current research, recent publications, thesis proposals and progress reports are among the topics discussed. Seminars are also held, irregularly, during the summer. Attendance at the Graduate Seminar is mandatory for full-time graduate students in the Faculty of Engineering.

Fellowships for Graduate Studies

Fellowships, ranging in value from $1,600 to $3,500, are available to full-time students. In addition, well qualified applicants will be considered for research assistantships ranging in value up to $3,000 and graduate assistantships carrying a stipend of up to $1,200. These awards are made only after the applicant has gained admission to the Faculty of Graduate Studies. Applications for such awards will be received up to March 1, 1969.

Carleton Computing Facilities

The Carleton University Computing and Data Processing Center is equipped with a General Electric 415 digital computer, located in the Steacie Building, and an IBM 1620 located in the C. J. Mackenzie Building. The 1620 is now associated primarily with undergraduate instruction, for both computer oriented courses and as one of the aids available to students. The 1620 is equipped with core and disk memory, line printer and card reader. The GE 415 is intended for graduate and faculty research and for administrative data processing. It is equipped with 32 K word core memory, magnetic tapes, a high speed printer and a card reader.

Use of the equipment of the Center by students registered in courses requiring its use, and for individual thesis research, is granted on the recommendation of the instructor or thesis supervisor, and the approval of the Dean of the Faculty of Engineering.

School of Architecture

Director of the School: Douglas Shadbolt, B.ARCH., F.R.A.I.C.

Advisory Council:
Davidson Dunton, President of the University
Douglas Shadbolt, Director of the School
John Ruptash, Dean of Engineering
Gordon S. Adamson, Ontario Association of Architects
D'Arcy Helmer, Architect, Ottawa
Ian McLennan, Vice-President, Central Mortgage and Housing Corporation
Guy Desbarats, Dean, Ecole d'Architecture, Université de Montréal

In September, 1968, Carleton University will accept students into the First year of a five-year program leading to the Bachelor of Architecture degree. Only the First year will be offered in the 1968-69 session, and an additional year of the curriculum will be added to the program each successive year. The first class will graduate in May, 1973. Detailed information about this new program will be available in the late summer of 1968 when a supplement to the Calendar will be issued.

The curriculum in Architecture at Carleton is expected to provide the student with:
(a) an understanding of our society with an emphasis on the identification of its building problems ranging from those of rudimentary shelter to the City itself, past, present and future;
(the contributions of many other disciplines will be relevant here, e.g. sociology, anthropology, psychology, history, geography, political science, economics);
(b) the means of problem analysis with experience in solving, at least partially, a wide range of building problems (the evolving design methodologies, systems analysis, and the use of computers will all be relevant here);
(c) the means for development of individual creativity and ability to communicate;
(d) the technical and professional information and skill needed to transform his designs into completed buildings.

The curriculum will provide a highly varied experience for the student as he moves back and forth from lectures, to seminars, to library, to studios, to workshops. It will also require a high degree of involvement. The major part of his contact with the teaching staff will be on a one-to-one basis in the studio, as the emphasis in the program will be placed on individual growth and development.

The resources of the Ottawa area, including those of Carleton University, are unique in their concentration of specialized personnel, laboratories, libraries and other facilities. These resources provide an ideal base on which to develop a School of Architecture. They will ultimately provide the opportunity and capability for a wide range of interdisciplinary academic and research programs in fields related to architecture such as housing, urban environmental studies, and industrialized building.

Admission Requirements for 1968-69
For admission to the First year of the program of studies leading to the Bachelor of Architecture degree, the applicant must have passed the Qualifying University year examinations at Carleton University with a grade of 60% or better in Mathematics, Physics and English; or the Ontario Senior Matriculation (Grade 13) examinations (or the equivalent examinations of other recognized examining bodies) in the following subjects, with an average of at least 60%.

1. Mathematics A and B.
2. Physics.
3, 4. Two of: Biology, Chemistry, English, Geography, History, or another language.

Students who are registered in Ontario Grade 13 for more than one year must present five subjects for admission.

Applicants from other provinces must present acceptable equivalent certificates generally required for admission to universities in their own provinces.

All applicants are required to present the results of the Scholastic Aptitude Test (verbal and mathematical) of the Ontario Institute for Studies in Education or the College Entrance Examination Board.

Faculty of Graduate Studies

Faculty of Graduate Studies

Dean of the Faculty:
M. S. Macphail, M.A., D.PHIL., F.R.S.C.

Courses leading to Master's degrees are offered in Biology, Canadian Studies, Chemistry, Classics, Comparative Literature, Economics, Engineering (Aeronautical, Civil, Electrical, Materials, Mechanical), English, French, Geography, Geology, German, History, International Affairs, Mathematics, Philosophy, Physics, Political Science, Public Administration, Psychology, Sociology, Spanish. Courses leading to Doctor's degrees are offered in Biology, Chemistry, Engineering, Geology, Mathematics, Physics, Political Science, Psychology. Each candidate will be under the direction of a department, institute, or school, and must comply with any special conditions prescribed. Graduate students are under the general regulations of the University, and also those stated below. Candidates are advised that the number of places is limited, and even if their qualifications are satisfactory, it may not be possible to admit them. If the candidate's application is received by April 1, every effort will be made to inform him as to acceptance by May 1.

A candidate who wishes to graduate at the May convocation must submit his thesis (where applicable) to his department, in examinable form, by April 15; and for the fall convocation, by September 15.

As stated in the inside front cover of this Calendar, the University reserves the right to make whatever changes circumstances may require, including cancellation of particular courses. Graduate courses may have to be withdrawn if the enrolment of full-time degree candidates is insufficient.

Master of Arts, Master of Science, and Master of Engineering

Admission Requirements
Candidates must normally have a bachelor's degree with at least second class standing for admission, and those with pass degrees will require the equivalent of two years' full-time study, while those with honours degrees will require the equivalent of one year's full-time study. Other candidates with equivalent standing may be admitted on departmental recommendation, subject to the approval of the Faculty of Graduate Studies. Candidates may be required to make up deficiencies in their background.

Course Requirements
The requirement for the final year of the Master's degree will be five courses or the equivalent. Directed special studies may be counted as one course, while a substantial thesis based on the student's own research may be counted as two courses. Some courses may be selected from those open to undergraduates (200-499), but when such a course is taken for graduate credit the completion of additional assignments may be required. At least three courses (including the thesis) must be selected from those numbered 500-599. A grade of 70% or better must be obtained in each course counted for credit towards the Master's degree.

Examinations
In addition to the usual examinations in individual courses, each candidate will be required to take either an oral examination on his thesis or a comprehensive examination on his field. At the direction of his department, both examinations may be required, or they may be combined. Departments may also require examinations in languages other than English.

Time Limitation

A candidate who fails to complete the requirements for the degree within five years from the date of his admission into the final year must, if he wishes to continue, apply for extension of time. A student who, within this period, remains unregistered in his degree program for a period of more than 16 months, will lose his graduate student status.

Thesis

The candidate must provide four typewritten copies (original and three carbons), or acceptable duplicated copies, on a suitable grade of paper, 8½ by 11 inches. The thesis must be typed double-space, in a standard type-face, on one side of the paper, with at least 1½ inch margin at the left. The candidate must meet any special requirements of his department governing the form of the thesis, including methods of bibliographical entry, use of diagrams, tables, and the like. A suitable abstract is to be provided, of length not exceeding 150 words. The original copy should be presented in an envelope, unbound in order of pagination, and the copies in spring binders, with the pages not mutilated in any way. The candidate gives the University the right to microfilm, photostat, and circulate the thesis and abstract, as may be required.

Doctor of Philosophy

Admission Requirements

Candidates will ordinarily have already taken the Master's degree. In some cases a combined Master's and Doctoral program may be arranged by the candidate's department.

Course and Thesis Requirements

The period of formal study and research required in the Ph.D. program will be at least two years of full-time study, or the equivalent, beyond the Master's qualification. The thesis will ordinarily carry a weight of about one half of the total requirement. The thesis must be a contribution to knowledge, and must demonstrate the candidate's capacity to undertake sustained research and to report the results in a fashion appropriate to the subject matter. The regulations stated above for the Master's thesis also apply, except that the abstract may be up to 600 words in length.

Examinations

(a) A qualifying examination may be set at the beginning of the course.

(b) A comprehensive examination covering prescribed fields will be set, ordinarily one year before the thesis is to be presented. This examination, which may be oral or written, or both, may include any work fundamental to a proper comprehension of the major subject.

(c) After the thesis has been received and approved, a final oral examination on the subject of the thesis and related fields will be held.

(d) Language requirements will be prescribed by departments, according to the needs of their students, and subject to approval by the Faculty of Graduate Studies. For further information see the departmental programs.

Time Limitation

A candidate who fails to complete the thesis within five years after his admission must, if he wishes to continue, apply for extension of time.

Graduate Fees

Full-time—M.A. M.Sc. M.Eng.	Qualifying graduate year. Same fee as for undergraduates (See p. 36).	
	With honours standing, or after qualifying year	$426.00
	For second year, if necessary	326.00
Ph.D.	First year	426.00
Ph.D.	Second year	426.00
Ph.D.	For residence thereafter, per year	100.00
Ph.D.	For non-residence, to keep name on books, per year	25.00

Part-time students taking fewer than 4 subjects (per subject):

Registered in a degree program	$ 97.50
Not registered in a degree program	$117.50

In addition there is an annual registration fee of $25 for all part-time graduate students who either are taking no courses in the current academic year or who defer completion of thesis beyond the fall convocation.

Included in the above composite fee for full-time students are the following:

Students' Association	$15.00
Athletics	16.00
Health Services	3.00
University Union Contribution	10.00

The above schedule of fees is subject to revision.

The Institute of Canadian Studies

Director: Pauline Jewett, M.A., PH.D.
Associate Director: B. C. Bickerton, M.A.
General Editor, Carleton Library: Robert L. McDougall, M.A., PH.D.

Committee of Management

Davidson Dunton, President of the University
David M. L. Farr, Dean, Faculty of Arts
Gordon C. Merrill, Associate Dean, Division II, Faculty of Arts
Wilfrid Eggleston, Professor Emeritus
Mary-Louise Funke (Art)
Gilles Paquet (Economics)
Robert L. McDougall (English)
Robert Vigneault (French)
Duncan M. Anderson (Geography)
Stanley R. Mealing (History)
T. Joseph Scanlon (Journalism)
Khayyam Z. Paltiel (Political Science)
Victor F. Valentine (Sociology and Anthropology)

Visiting Fellows:

1962-63: Professor Mason Wade
1963-64: Hon. M. J. Coldwell
1964-65: Professor S. F. Wise
1965-66: Douglas Fisher
1965-66: Dr. Diamond Jenness
1966-67: O. S. Soroko-Tsupa, Lecturer, Department of History, Univ. of Moscow
1967-68: Michael Gnarowski, Department of English, Sir George Williams University
1967-68: Alfred Purdy, Canadian poet
1968-69: Harry J. Boyle, Vice-Chairman, Canadian Radio-Television Commission

The Graduate Program

Through the medium of the Institute, nine departments in the humanities and social sciences co-operate to offer an M.A. program in Canadian Studies which is inter-disciplinary in emphasis but which at the same time enables the student to maintain a firm base in the discipline of his choice. The skills and attitudes of particular disciplines are therefore respected; they are brought, wherever possible, into a relationship in which one set of skills and attitudes supports and extends the range of another. This context is further widened by the provision of a comparative dimension to Canadian Studies wherein students are encouraged to see certain aspects of Canadian culture in relation to corresponding aspects of the cultures of countries with which Canada has had traditional ties: Great Britain, France, the United States, Australia. The proximity of Carleton University to the National Library, the Library of Parliament, the Public Archives of Canada, the Dominion Bureau of Statistics, and the libraries of government departments and embassies ensures excellent facilities for research in the fields of study with which the Institute is concerned.

M.A. Requirements

1. Three approved courses plus a thesis
          or
   four approved courses plus a research essay
2. An oral comprehensive examination

Eligibility for Admission
Applicants must normally have an Honours B.A., with at least second class standing, in one of the disciplines represented in the Institute.
Such applicants will normally complete the M.A. in one year unless they need to take preliminary work in fields they wish to enter at the graduate level but in which they have had insufficient undergraduate training.
Applicants with pass degrees, and at least second class standing, may be admitted. They will require the equivalent of two years' full-time study for the M.A.
A reading knowledge of French is a prerequisite for admission.

Course List
Interdisciplinary Seminar (Canadian Studies 12.500)
Research Essay (Canadian Studies 12.598)
Thesis (Canadian Studies 12.599)
The Economic Development of Canada (Economics 43.325)
The Canadian Economy (Economics 43.520)
The Literary Imagination in Canada (English 18.587)
La poésie canadienne de langue française (French 20.521)
Geography of the Northern Lands (Geography 45.430)
Historical Geography (Geography 45.435)
Selected Problems in Canadian History (History 24.430)
New France (History 24.431)
Canada-United States Relations (History 24.443)
The British Commonwealth of Nations (History 24.473)
The Social and Economic History of the Canadas, 1784-1850 (History 24.530)
Post-Confederation Canada (History 24.533)
The Press in Modern Society (Journalism 28.410)
Public Issues and Problems (Journalism 28.460)
Government of Canada (Political Science 47.400)
Federalism (Political Science 47.405)
Provincial and Municipal Government (Political Science 47.500)
The Political Process in Canada (Political Science 47.510)
Nationalism (Political Science 47.520)
The Canadian and American Political Traditions (Political Science 47.535)
Canada in World Affairs (Political Science 47.560)
Constitutional Law (Public Law 51.450)
Ethnology of Canada (Sociology 53.420)
Tutorial in Sociology or Anthropology (Sociology 53.490)
Canadian Society (Sociology 53.525)

Carleton's Institute and the Institute of Commonwealth and Comparative Studies at Queen's University, Kingston, co-operate in the related fields of Canadian and Commonwealth Studies. Graduate students in the Institute of Canadian Studies' program may be attached, between terms or for a summer session, to the Institute at Queen's, where they will be offered facilities for study and access to the special Canadian and Commonwealth collections of the Queen's University library. Students in the Institute of Commonwealth and Comparative Studies may similarly be attached for short periods of time to the Institute of Canadian Studies at Carleton.

Forms for admission to graduate studies may be obtained from the Dean, Faculty of Graduate Studies. Completed applications should be sent to the Director of the Institute of Canadian Studies. The closing date for applications for University Fellowships (see page 331) is March 1.

Related Activities of the Institute

The Institute of Canadian Studies sponsors and gives editorial supervision to the *Carleton Library,* a series of paperback reprints and compilations of classic material relating to Canadian history, law, economics, politics, anthropology, sociology, geography and journalism. There are forty-one volumes to date.

A new series, *Carleton Contemporaries,* launched in 1968, consists of original monographs and compilations focussing on the issues of the day — political, social, economic, cultural. It is designed to stimulate informed discussion of current and controversial issues and to improve the two-way flow of ideas between people and governments.

The Institute also sponsors a variety of public lectures and seminars. The most prominent of these is the "Living Tradition" series, now available in five volumes.

School of International Affairs

Director of the School: H. Edward English, B.A., PH.D.
Associate Director: Robert A. MacKay, B.A., PH.D., LL.D., F.R.S.C. (on leave of absence, 1968-69)
Professors of International Affairs:
Lester B. Pearson
Norman A. Robertson
Visiting Professors: Alastair Buchan, Charles Foulkes
Research Fellow: Carsten Holbraad

Committee of Management
Davidson Dunton, President of the University
David M. L. Farr, Dean, Faculty of Arts
Gordon C. Merrill, Associate Dean, Division II, Faculty of Arts
H. Edward English, Director, School of International Affairs
Richard D. Abbott (Public Law)
Adam Bromke (Political Science)
N. Harvey Lithwick (Economics)
Robert A. MacKay (Political Science) (on leave of absence, 1968-69)
Norman A. Robertson (International Affairs)
John R. Strong (Soviet and East European Studies)
Philip E. Uren (Geography)
Bruce A. McFarlane (Sociology)

Associated Faculty
Jon Alexander (Political Science)
Duncan M. Anderson (Geography)
G. Peter Browne (History) (on leave of absence, 1968-69)
Richard L. Carson (Economics)
Ehsan Choudhri (Economics)
Gordon S. Couse (History)
Michael G. Fry (History)
Allan Gotlieb (Political Science)
Teresa M. Harmstone (Political Science)
T. Murray Hunter (History)
S. F. Kaliski (Economics)
Peyton V. Lyon (Political Science) (on leave of absence, 1968-69)
C. H. McMillan (Economics)
Khayyam Z. Paltiel (Political Science)
Denis P. Forcese (Sociology)
Harald von Riekhoff (Political Science)
George Roseme (Political Science)
D. R. Fraser Taylor (Geography)
Norman M. Willis (History)

The School of International Affairs seeks to encourage and promote graduate study, research, public education and publication in the field of international affairs. Established in 1965 with the generous support of the Hon. Norman M. Paterson, a long-time member of the Board of Governors, the School offers a program of advanced studies leading to the degree of Master of Arts in International Affairs for persons preparing for careers in universities, government, business, journalism, and other spheres. The School is also concerned to stimulate research in international affairs, especially in such areas as comparative foreign policies, international trade and finance, Canada's external relations, international organization, and East-West relations. In addition to providing facilities for faculty research, it intends to establish a number of research professorships and fellowships, to promote publication, and to

assist visiting specialists to take full advantage of the research potentialities of the national capital. The School also sponsors occasional special seminars, conferences and public lectures.

The School is administered by a Director and an interdepartmental Committee of Management composed of university officers and faculty members concerned with teaching and research in international affairs. The School works in close association with the Committee on Soviet and East European Studies.

Acting within the policies approved by the Committee of Management and subject to the general academic requirements laid down by the Faculty of Graduate Studies and the Senate, the Director administers the affairs of the School and co-ordinates the participation of the various interested departments. He has broad authority to recommend the admission of students and to approve their programs of study. He is also responsible for the research and publishing program of the School and for liaison with other centres for the study of international affairs.

Master of Arts in International Affairs

Admission Requirements

1. An Honours degree or its equivalent in History, Political Science or Economics, with at least good second class standing and *three* international affairs courses at least one of which should be *An Introduction to the History of International Relations* (History 24.380), or *International Politics* (Political Science 47.260), or *Theories of International Relations,* (Political Science 47.360) or equivalents. Applications from persons with Honours degrees in other disciplines will be assessed on their merits. Candidates without the necessary courses in international affairs in their undergraduate program will have to take additional courses.

2. Candidates with a Pass degree in History, Political Science, or Economics, with at least second class standing may be admitted to the qualifying year. They may, however, be required to take certain introductory courses in international relations not already taken. Applications from majors in other disciplines will be considered on their merits.

3. A working knowledge of French. In certain cases, candidates may be permitted to meet this requirement during their course, or to substitute another approved major language.

Degree Requirements

A program will be worked out in each individual case in accordance with the academic background, interests and needs of the candidate. Persons intending to proceed to the Ph.D. should inform the Director as early as possible in order that their MA program may be planned with this in mind.

Qualifying Year

Five approved courses selected with a view to providing students with the necessary background in more than one discipline for advanced study in international affairs.

Students who have not already completed a basic course in international relations must take at least one of *An Introduction to the History of International Relations* (History 24.380), *International Politics* (Political Science 47.260), or *Theories of International Relations* (Political Science 47.360). In addition, at least two other international affairs courses are required.

Students who have not completed a course in international economics will normally be required to take Economics 43.360 either in the qualifying or final year. For those who have not taken any course in economic principles (the normal pre-requisite of Economics 43.360) students must satisfy the School that they are qualified to enter Economics 43.360.

The balance of courses may be chosen from related fields. A minimum average of 68% is required to proceed to the Master's year.

Master's Year
1. *Three* approved graduate courses, including the *Interdisciplinary Seminar* (International Affairs 46.500) and at least one other international affairs course.
2. A comprehensive oral examination to test the ability of the candidate to relate various disciplines to the study of international affairs.
3. A substantial thesis involving original research on an approved subject in the field of international affairs (equivalent to two courses). In certain circumstances, candidates may take two additional courses (or one course and a research essay) instead of submitting a thesis.
4. A minimum average of 70% on the work of the Master's year.
5. The ability to read and converse in French (or in certain cases a major language other than English or French) with moderate fluency. The oral French requirement may be met by successfully completing French 20.201*.

Doctor of Philosophy in Political Science

Although the School does not offer a doctorate in International Affairs, students may study for the degree of Doctor of Philosophy in Political Science with emphasis on international relations. International relations may be chosen as one of the three fields of concentration (the other two may be chosen from political theory, political institutions, public administration, the politics of a particular country or area, and an approved field in a related discipline). In addition, the thesis, which is equivalent to half the requirements for the degree, may be written on an aspect of international relations.

Course Offerings

International Affairs 46.500 and
International Affairs 46.505, Interdisciplinary Seminars

Offered jointly by the participating departments. For 1968-69 the themes will be: for 46.500, International Integration, with special reference to Western Europe; and for 46.505, Political and Economic Development.
Day Division: 1968-69 (seminar three hours a week).

International Affairs 46.520 and*
International Affairs 46.521, Problems of International Affairs*

(Half courses).
Lectures and seminars on selected topics.

International Affairs 46.598, Research Essay

Day and Evening Division: 1968-69 (tutorial hours arranged).

International Affairs, 46.599, M.A. Thesis

Day and Evening Division: 1968-69 (tutorial hours arranged).

The following additional international affairs courses are offered by the participating departments — for course descriptions, see departmental listings.

International Economics (Economics 43.360)
International Trade (Economics 43.460)
Diplomacy of the Great Powers, 1789-1890 (History 24.280)
Diplomacy of the Great Powers, 1890-1945 (History 24.380)
Modern History of the Far East (History 24.385)
Canada-United States Relations (History 24.443)
The British Commonwealth of Nations (History 24.473)
Selected Problems in Modern Diplomatic History (History 24.480)
International Politics (Political Science 47.260)
Theories of International Relations (Political Science 47.360)
International Institutions (Political Science 47.460)
Canada in World Affairs (Political Science 47.560)
American Foreign Policy (Political Science 47.565)
Soviet Foreign Policy (Political Science 47.570)
Africa and Asia in World Affairs (Political Science 47.580)
Contemporary International Politics (Political Science 47.585)
Tutorial in Selected Field (Political Science 47.590)
International Law (Public Law 51.555)

Related Courses
The Soviet Economy (Economics 43.370)
Economic Growth and Development (Economics 43.455)
Comparative Political Economy (Economics 43.470)
Europe (Geography 45.250)
Geography of Intertropical Africa (Geography 45.330)
Soviet Union and East Europe (Geography 45.360)
Modern Russia (History 24.260)
France in Modern Times (History 24.316)
The German World in Modern Times (History 24.318)
History of Modern Europe (History 24.365)
Selected Problems in Russian and Soviet History (History 24.460)
Government and Politics in Western Europe (Political Science 47.210)
The Commonwealth in Asia and Africa (Political Science 47.310)
Soviet Government and Politics, (Political Science 47.320)
Modern Political Thought (Political Science 47.333, or 47.430)
Comparative Government (Political Science 47.505)
Nationalism (Political Science 47.520)
Comparative Public Administration (Political Science 47.545)
Social and Cultural Change (Sociology 53.360)

For additional courses, see departmental listings.

Details of Courses

The course numbering pattern is, in general, as follows:

010-099   Courses usually taken in the Qualifying University year.
100-199   Courses usually taken in the First year.
200-299   Courses usually taken in the Second year.
300-399   Courses usually taken in the Third year.
400-499   Courses ordinarily taken by students in the Fourth year, that is, final year of Engineering or Honours Arts and Science.
500-599   Courses ordinarily taken by Graduate students.

N.B. Half courses are marked with an asterisk (with the exception of Engineering half courses).

A listing of discontinued courses is available upon request to the Office of the Registrar, Carleton University.

Each course number is prefixed by the number of the Department or School under whose auspices the course is offered. *At the time of registration, advisers and students are required to make certain that both the prefix and the course number for each course in which registration is sought are clearly indicated on the face of the registration form.*

Department Numbers

Dept. No.	Department	Dept. No.	Department
10	Interdisciplinary Humanities	54	Anthropology
11	Art	55	Soviet and East European Studies
12	Canadian Studies	60	Interdisciplinary Sciences
13	Classical Civilization	61	Biology
14	Classics	65	Chemistry
15	Greek	67	Geology
16	Latin	69	Mathematics (Pass)
17	Comparative Literature	70	Mathematics (Honours)
18	English	75	Physics
20	French	80	Architecture
22	German	81	Applied Mechanics
24	History	82	Structural Analysis and Design
26	Italian	83	Soil Mechanics
28	Journalism	84	Transportation
30	Music	86	Materials
32	Philosophy	87	Mechanical Analysis and Design
34	Religion	88	Mechanical Systems
36	Russian	89	Fluid Mechanics
38	Spanish	90	Thermodynamics and Heat Transfer
40	Interdisciplinary Social Sciences	93	Electrical and Electronic Circuits
41	Accounting	94	Communication and Control Systems
43	Economics	95	Computer and Switching Systems
45	Geography	96	Solid State Devices
46	International Affairs	97	Electromagnetics
47	Political Science	98	Electrical Machines and Power Systems
49	Psychology	99	Engineering Projects and Theses
51	Public Law		
52	School of Social Work		
53	Sociology		

Interdisciplinary Courses

Humanities 10.100

An examination of selected works, from Biblical times to the present, illustrating the various dominant views on the nature of man and his attempts to understand himself and the world about him.
Day Division: Annually (lectures three hours a week; discussion groups once every two weeks).
B. Wand, D. G. Bowen, A. R. Gualtieri and members of the faculty

Social Science 40.487, Interdisciplinary Research Seminar 1968-69, Aspects of Urban Studies

An interdisciplinary course for Honours students, involving the active participation of at least three departments. There will be an examination of various aspects of urban analysis and the main concern will be a substantial research project, subject to the supervision of the various faculty members.
Prerequisite: Enrolment in an Honours program in one of the participating departments; or the permission of the instructors.
Day Division: 1968-69. (time to be arranged).

Science 60.100

This course is designed to acquaint students in the Arts, Humanities, and Social Sciences with the methodology of science. Beginning with a general description of the aims, objects, and methods of the experimental sciences, the course will examine a series of case histories of scientists, their place in the philosophical and intellectual milieu of their time, and their contributions to the development of scientific concepts and an interpretation of the natural world.
Day Division: Annually (lectures three hours a week).
H. H. J. Nesbitt and Margaret D. Bell

Science 60.400, Topics in the History and Philosophy of Science

An introduction to philosophical issues of importance to understanding science, a survey of historical origins of modern science; readings on the sociological structure of science and the relationship of science to contemporary society. The course is intended for Honours students in the Fourth year.
Prerequisite: Recommendation of the major department and permission of the instructor.
Day Division: 1968-69 (one two-hour seminar a week plus guest lecturers to be arranged).
C. H. Langford and lecturers

Engineering 95.065, 1620 Fortran Programming

Engineering 95.360, Introduction to Computer Science

Accounting

Associate Professors	R. Caterina, W. R. Scott,
	J. B. Waugh (on leave of absence, 1968-69)
Assistant Professor	L. N. Ledohowski
Sessional Lecturers	P. J. Faulkner, A. B. Larose, N. G. Ross, G. P. Wilson

Accounting is basically communication—communication of the results of business activity to interested parties such as shareholders, investors, statisticians, governments; and also communication to business management of the information needed to aid in managing the enterprise.

As firms continually become larger and more complex, the need for information on financial position and results of operations becomes greater and at the same time this information becomes more difficult to obtain and interpret.

A knowledge of the means by which the accounting process records and summarizes transactions and attempts to present the results in a meaningful manner is necessary to anyone who uses or relies on financial statements.

Students who, after achieving the B.Com. degree, intend to proceed to professional accounting designations—Chartered Accountant (C.A.), Certified General Accountant (C.G.A.), or Registered Industrial Accountant (R.I.A.)—should consult Professors Caterina or Scott before entering the Third year of the Commerce course.

Accounting 41.100, An Introduction to Accounting

Accounting method; concepts of income determination and asset valuation; accounting information and managerial decisions.
Text: Gordon and Shillinglaw: *Accounting: A Management Approach.*
Day Division: Annually (lectures and problems three hours a week).
Evening Division: Annually (lectures two hours a week; bi-weekly problem periods).
Members of the Department

Accounting 41.200, Intermediate Accounting

Further development of problems of revenue recognition and asset valuation; flow-of-funds analysis; financial statement analysis; topics from managerial accounting.
Prerequisite: Accounting 41.100.
Day Division: Annually (lectures and problems three hours a week).
Evening Division: Annually (lectures and problems three hours a week).
Members of the Department

Accounting 41.301*, Forms of Business Organization: The Accounting Implications

Consideration of the accounting problems associated with specific types of organizational form. Topics will include: partnerships; branch operations; mergers, amalgamations and reorganizations; consolidations; reporting for decentralized operations.
Prerequisite: Accounting 41.200.
Day Division: 1968-69 (lectures two hours a week, first term).

Accounting 41.306*, Financial Reporting Problems

Discussion and analysis of selected problems relating to the presentation and interpretation of accounting information on financial position and operating performance. Material for discussion will be drawn from real situations, and from cases.
Prerequisite: Accounting 41.200.
Day Division: 1968-69 (lectures two hours a week, second term).

Accounting 41.325*, Cost Accounting

An introduction to the use of accounting information for purposes of cost control and performance evaluation. Topics will include: analysis and control of elements of cost; design and use of job order, process cost and standard cost systems; analysis of cost variances.
Prerequisite: Accounting 41.200.
Day Division: 1968-69 (lectures two hours a week, first term).

Accounting 41.326*, Budgeting

Discussion of the role of accounting in the functional areas of forward planning, performance evaluation, and the control of operations. Special attention will be given to the problems of forecasting and long-range planning.
Prerequisite: Accounting 41.200.
Day Division: 1968-69 (lectures two hours a week, second term).

Accounting 41.340, Government Accounting and Finance

A comprehensive analysis of government financial and budgeting concepts and procedures, including program and performance budgeting, costing, long-term planning, accounting, auditing and control. Canadian budgeting practices will be compared with those of Britain and the United States. (See Political Science p. 263).
Evening Division: 1968-69 (lectures two hours a week).
N. G. Ross and G. P. Wilson

Accounting 41.365, Computer Technology Applied to Commerce Problems

Introduction to digital computer organization and operations. Programming techniques, stressing the use of FORTRAN IV and COBOL. Numerical solution to problems of interest in social and management sciences. Simulation of business problems *and* the use of business strategies. (This course is also listed as Economics 41.365).
Prerequisites: Mathematics 69.101 and Economics 43.220 or permission of the instructors.
Evening Division: 1968-69 (lectures two hours a week, laboratory two hours a week).

Accounting 41.400, Accounting Theory

A study of the evolution of accounting theory and practices, leading to an analysis of current developments and areas of controversy.
Prerequisite: Accounting 41.200.
Not offered, 1968-69.

Architecture

Professor;
Director of the School   Douglas Shadbolt
Assistant Professor   G. D. Milne

Candidates for the Bachelor of Architecture degree are required to complete a program of studies covering five years after senior matriculation. The admission requirements are outlined on p. 84.

Details of courses are in preparation and will be published as a supplement to the Calendar.

Art

Assistant Professor   Mary-Louise Funke

The Department's primary emphasis is on art history, the study of art and architecture as a tangible evidence of one aspect of man's creative achievements. The offerings of the Department are intended to complement work in the humanities and not to provide a training in the studio aspects of art.

It is not possible, in 1968-69, to undertake a major in the Department of Art. It is intended to develop a program for a major or combined major in Art over the next few years. Courses in the Department are available as options to students in any degree program in the University.

Art 11.100, Introduction to the History of Art

This course will provide a general approach to the main principles governing the character of Occidental art through the ages. Emphasis is placed on the analysis of painting, sculpture and architecture, and, where applicable, on the decorative arts, explaining problems and attitudes that were typical for major periods. Examples from pre-history to contemporary art will be used.

Day Division: Annually (lectures three hours a week).
Mary-Louise Funke

Art 11.230, European Art of the Renaissance

This assessment of the major developments in the arts of the fourteenth to the sixteenth centuries in Italy and northern Europe will give particular attention to new art theories, important personalities and works of art originating from this period.

Prerequisite: Art 11.100 or equivalent.
Day Division: 1968-69 (lectures three hours a week).
Lecturer to be announced

Art 11.240, European Art from 1600 to 1750

Major contributions to the baroque and classical principles in architecture, sculpture, painting and the minor arts will be examined. Particular emphasis will be placed on Bernini, Velazquez, Rubens, Rembrandt, and Wren. The course will conclude with a study of rococo phenomena.

Not offered, 1968-69.

Art 11.250, European Art from 1750 to 1890

A study of the development of the visual arts in Western Europe and certain aspects of North America to assess the evolution from the classical theory of beauty, proclaimed for example by Reynolds and David, through that of exponents of Romanticism, Realism, Impressionism and post-Impressionism. The course concludes with art theories of the Fin-du-siècle.

Prerequisite: Art 11.100 or equivalent.
Day Division: 1968-69 (lectures three hours a week).
Mary-Louise Funke

Art 11.310, Canadian Art

A study of the evolving art scene in Canada from the 17th century to the present. While the course is concerned primarily with painting, some examination will be made of woodcarving and sculpture, architecture and the minor arts. Canadian developments will be discussed in the context of movements in Europe and America.
Not offered, 1968-69.

Art 11.330, Studies in the Renaissance

An intensive study of selected Renaissance artists. (The lecturer will determine the particular problems and personalities to be discussed).
Prerequisite: Art 11.100 or equivalent.
Day Division: 1968-69 (lectures three hours a week).
Lecturer to be announced

Optional Studio Facilities will be available to be used in conjunction with technical problems encountered in the academic courses.

See also:

Classical Civilization 13.330, Classical Art and Archaeology

Philosophy 32.240, Aesthetics.

Biology

Professor; Chairman of the Department	F. Wightman
Professors	V. N. Iyer, H. H. J. Nesbitt, G. Setterfield (on leave of absence, 1968-69)
Associate Professors	C. A. Barlow, W. I. Illman, K. W. Joy, P. E. Lee, H. G. Merriam, D. A. Smith, J. A. Webb
Assistant Professor, and Curator of the Herbarium	Isabel L. Bayly
Assistant Professors	T. W. Betz, Jean P. Fletcher, D. R. Gardner, J. D. H. Lambert, Margaret E. McCully, H. Yamazaki
Sessional Lecturer	Elizabeth M. Arnason
Demonstrators	Mary-Lou Florian, Lynn Grey, Florence E. Robertson, Eliezer White
Teaching Fellow	K. Brasch
Postdoctorate Fellows	M. E. Ahmed, W. Allaway, Ann Ashford, E. Erez, Suman Pathak, Elnora Schneider, R. P. Sinha
Curator of Greenhouses	H. Datema

Undergraduate Programs

Students reading for an Honours degree or a major in Biology must arrange their courses, in consultation with a member of Faculty of the Department, in one of the patterns outlined below.

In choosing optional science courses, students may select courses offered by Departments in the Natural Sciences and Mathematics, and from the following courses offered by the Department of Psychology: Psychology 49.205, 49.220*, 49.221*, 49.270, 49.305, 49.320, 49.380, 49.405, 49.420, 49.470.

Major in Biology

B.Sc. Program

Students reading for a Bachelor of Science degree majoring in Biology must satisfy the general requirements for Science stated on pp. 72-74, and take the following courses in a pattern approved by the Department:
1. Biology 61.100
2. Biology 61.205, 61.210, 61.215, 61.340 and 61.360
3. Chemistry 65.100, Physics 75.100 or 75.105 and Mathematics 69.100 or 69.101
4. Two additional science courses, other than Biology, above the 100 level
5. One optional science course
6. Three approved courses in the Faculty of Arts.

B.A. Program

Students who plan to read for a Bachelor of Arts degree majoring in Biology must obtain permission from the Chairman of the Department before registration, satisfy the general requirements for Arts stated on pp. 49-53, and take the following courses in a pattern approved by the Department:
1. Biology 61.100
2. Biology 61.205, 61.210, 61.215, 61.340 and 61.360
3. Chemistry 65.105
4. One optional science course not in Biology
5. Four courses chosen to complete the Arts I requirements on p. 51.
6. Three additional courses preferably at an advanced level.

B.A. Program (*Pre-medical*)

Prospective pre-medical students are advised that many medical schools prefer that candidates who read for a Bachelor's degree prior to entry into Medicine obtain a

sound grounding in basic science and arts subjects rather than anticipate medical school courses. To this end, a special program leading to the Bachelor of Arts degree in Biology (Pre-medical) has been designed. Students entering this program are advised to take the following courses in a pattern approved by the Department:

1. Biology 61.100
2. Biology 61.205, 61.210, 61.215 and 61.340
3. Chemistry 65.105 and 65.220, Physics 75.100 or 75.105 and Mathematics 69.100 or 69.101
4. English 18.100 or 18.101
5. Philosophy 32.100 or Humanities 10.100
6. A social science
7. A language course numbered in the 100's
8. Two optional courses might include Sociology, Psychology or Statistics.

Interested students should consult the Chairman of the Department to arrange their pre-medical program to meet the individual requirements of the medical school to which they hope to gain admission.

Honours Program

Students planning a professional career in biology are strongly advised to enter the Honours program as soon as possible, and certainly by the end of the second year. An Honours degree is almost essential for admission to graduate studies. Students reading for an Honours Bachelor of Science degree in Biology must satisfy the general requirements for Honours stated on pp. 47 and 73 and arrange their course programs in consultation with the Chairman of the Department. The following courses are recommended:

1. Biology 61.100
2. Biology 61.205, 61.210, 61.215, 61.340, 61.350, 61.360, 61.425 or 61.435 and 61.498
3. Chemistry 65.100, Physics 75.100 or 75.105 and Mathematics 69.100 or 69.101
4. Two additional science courses, other than Biology, above the 100 level
5. Three optional science courses
6. Three approved courses in the Faculty of Arts.

Honours students must pass an oral comprehensive examination at the conclusion of their period of study. They must, in addition, demonstrate a reading knowledge of French, German or Russian. Students in their final year of the Honours program are advised to attend the regular Departmental Seminar.

Students wishing to obtain the Ontario College of Education Interim High School Assistant's Certificate, Type A, are advised to consult the Chairman of the Department as soon as possible in their university career in order that an appropriate Honours program may be arranged. (See also p. 35).

Graduate Studies

The Department of Biology offers programs of study and research leading to the M.Sc. and Ph.D. degrees in the following fields: Animal Physiology, Animal Ecology, Biochemistry of Viruses, Cytology, Developmental Endocrinology, Entomology including Acarology, Mammalogy, Microbial and Molecular Genetics, Mycology and Plant Pathology, Plant Morphogenesis, Plant Ecology, Plant Physiology and Biochemistry, Plant Systematics, Virology, and Wildlife Biology.

Candidates for graduate degrees must satisfy the general requirements of the Faculty of Graduate Studies stated on pp. 88 and 89 and in addition demonstrate a reading knowledge of the following languages in addition to English:

M.Sc.—either French or German.

Ph.D.—two languages, one of which must be French or German.

All candidates for the Ph.D. degree must pass an oral comprehensive examination before submission of a thesis.

During the period of residence all graduate students are expected to attend, and make some contribution to, the regular Departmental Seminar.

Biology 61.100, Introductory Biology

An introductory lecture and laboratory course on the fundamental principles of biology.
Text: To be announced.
Day Division: Annually (lectures three hours a week, laboratory three and one half hours a week).
T. W. Betz, D. R. Gardner, J. D. H. Lambert, P. E. Lee, Margaret McCully, D. A. Smith and J. A. Webb

Biology 61.205, Animal Morphology

Classification, functional morphology, development and evolution of the major animal groups.
Texts: Barnes, *Invertebrate Zoology*.
Romer, *The Vertebrate Body*.
Prerequisite: Biology 61.100.
Day Division: Annually (lectures three hours a week, laboratory four hours a week).
Jean P. Fletcher, F. E. Banim.
Evening Division: 1968-69 (lectures three hours a week, laboratory four hours a week).

Biology 61.210, Plant Morphology

A course on the morphology, reproduction, and historical evolution of plants.
Text: Scagel et al., *An Evolutionary Survey of the Plant Kingdom*.
Prerequisite: Biology 61.100.
Day Division: Annually (lectures two hours a week, laboratory four hours a week).
W. I. Illman and J. D. H. Lambert

Biology 61.215, Genetics

A lecture and laboratory course on the mechanisms of inheritance and the nature of gene structure, composition and function.
Texts: Sagar and Ryan, *Cell Heredity*.
Watson, *Molecular Biology of the Gene*.
Prerequisites: Biology 61.100, 61.205 or 61.210.
Day Division: Annually (lectures two hours a week, laboratory four hours a week).
V. N. Iyer

Biology 61.340, Physiology

A lecture and laboratory course on the fundamental principles of plant and animal physiology.
Texts: Devlin, *Plant Physiology*.
Bell, Davidson and Scarborough, *Textbook of Physiology and Biochemistry*, 6th Edition.
Gordon, *Animal Function: Principles and Adaptations*.
Prerequisites: Biology 61.100 and Chemistry 65.100 or 65.105.
Day Division: Annually (lectures three hours a week, laboratory four hours a week).
D. R. Gardner and K. W. Joy

Biology 61.350, Introductory Biochemistry

Chemistry and metabolism of biological compounds. Properties and functions of enzymes. Control of metabolism.
Prerequisites: Biology 61.100 and Chemistry 65.220 or 65.222.
Day Division: Annually (lectures two hours a week, laboratory four hours a week).
H. Yamazaki

Biology 61.360, Ecology

A lecture and laboratory course on the principles of plant and animal ecology.
Text: To be announced.
Prerequisites: Biology 61.205 and 61.210.
Day Division: Annually (lectures two hours a week, laboratory and seminars four hours a week).
Isabel Bayly and H. G. Merriam

Biology 61.375, Neurophysiology

A lecture and laboratory course on comparative neurology of the vertebrates and general animal physiology. This course is primarily designed for students who are planning work in Psychology.
Text: To be announced.
Prerequisite: Biology 61.100 or 61.205, or permission of the instructors.
Not offered, 1968-69.

Biology 61.380, The Flora and Fauna of Canada

An introduction to practical taxonomy and biogeography through field and laboratory study of representative Canadian plants and animals with emphasis on local forms. Each student must make collections of plants and animals during the summer before the course is taken. Detailed directions may be obtained from the department.
Prerequisites: Biology 61.205 and 61.210.
Day Division: Annually (lectures one hour a week, laboratory four hours a week).
Isabel Bayly, D. A. Smith and Members of the Department

Honours Courses

Biology 61.400, Phycology and Mycology

A course on the morphology, evolution, and biological importance of the algae and fungi.
Text: Smith, *Cryptogamic Botany,* Vol. I.
Prerequisite: Biology 61.210.
Day Division: 1968-69 and alternate years (lectures two hours a week, laboratory four hours a week).
W. I. Illman

Biology 61.405, Invertebrate Zoology

An advanced course on the classification, morphology, comparative physiology and evolution of invertebrate animals.
Reference texts: Grasse, *Traite de Zoologie,* appropriate volumes.
Hyman, *The Invertebrates.*
Prerequisites: Biology 61.205 and 61.215.
Day Division: 1968-69 and alternate years (lectures two hours a week, laboratory four hours a week).
H. H. J. Nesbitt and Jean Fletcher

Biology 61.415, Chordate Zoology

An advanced course on the classification, geographic distribution and evolution of the major groups of chordates. As part of his practical work, each student must make a collection of chordates, preferably during the summer before the course is taken. Detailed directions may be had on application to the instructor.
Texts: Colbert, *Evolution of the Vertebrates.*
Orr, *Vertebrate Biology.*
Prerequisite: Biology 61.205.
Day Division: 1969-70 and alternate years (lectures two hours a week, laboratory four hours a week).
D. A. Smith

Biology 61.420, Cytology

A study of the structure, composition and function of cells at the microscopic and macro-molecular levels. Training will be given in techniques of light microscopy, photomicrography, electron microscopy, autoradiography and cell fractionation. Enrolment limited.
Text: Selected references.
Prerequisites: Biology 61.215, a course in physiology or biochemistry and consent of the instructor.
Day Division: 1969-70 and alternate years (lectures two hours a week, laboratory four hours a week).
G. Setterfield

Biology 61.425, Plant Physiology

A lecture and laboratory course on the water relations, mineral nutrition, carbon and nitrogen metabolism, and growth and development in plants.
Text: To be announced.
Prerequisites: Biology 61.100 and Chemistry 65.220 or 65.222.
Day Division: Annually (lectures two hours a week, laboratory four hours a week).
J. A. Webb and F. Wightman

Biology 61.430, Microbiology

The general principles and practice of microbiology: consideration will be given the metabolism and biology of the bacteria and related protists, the purification and properties of viruses and the relationship of viruses to their host cells.
Text: To be announced.
Prerequisites: Chemistry 65.220 or 65.222 and a course in physiology at least concurrently.
Not offered, 1968-69.
W. I. Illman

Biology 61.435, Animal Physiology

A study of the general principles underlying the functional activities of cells, tissues, organs, and the intact body of a wide variety of animals.
Text: Reference list to be assigned.
Prerequisites: Biology 61.340, Chemistry 65.220 or 65.222 and Physics 75.100 or 75.105.
Day Division: 1969-70 and annually thereafter (lectures two hours a week, laboratory four hours a week).
D. Gardner

Biology 61.440, Taxonomy of the Flowering Plants

An introduction to evolutionary mechanisms underlying diversity in the flowering plants, the structure and organization of this diversity, the principles of phylogeny and classification, taxonomy in relation to human affairs. Laboratory work will deal mainly with studies of the local flora. A project will be assigned. Students planning to take this course will be required to make a collection of 100 species of plants during the summer or fall of 1969.
Text: To be announced.
Prerequisite: Biology 61.210.
Day Division: 1969-70 and alternate years (lectures two hours a week, laboratory four hours a week).
T. Mosquin

Biology 61.455, Embryology

A lecture and laboratory course on the descriptive and experimental principles of chordate embryology.
Text: To be announced.
Prerequisite: Biology 61.205, or consent of the instructor.
Day Division: 1968-69 and alternate years (lectures three hours a week, laboratory three hours a week).
T. W. Betz

Biology 61.460, Entomology

A course on the morphology and physiology of representatives of the more important orders and families of insects. Students planning to take this course must consult with the instructor in the previous spring to arrange for insect collections.
Reference Texts: Snodgrass, *Principles of Insect Morphology*.
Wigglesworth, *Insect Physiology*.
Prerequisite: Biology 61.205.
Day Division: 1969-70 and alternate years (lectures two hours a week, laboratory four hours a week).
H. H. J. Nesbitt and Elizabeth Arnason

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Biology 61.465, Quantitative Ecology

Quantitative and qualitative methods of analysis of the distribution and abundance of plant and animal species, of communities and related environmental phenomena.

Each student will undertake an ecological project during the summer before the course is taken and submit a report and collection of voucher specimens during the fall term.

Immediately prior to the fall term, he will attend a field course illustrating important principles and techniques of field ecology through studies of selected biotic communities. Further information may be had on application to the department.

Prerequisites: Biology 61.360 and 61.380.

Day Division: 1969-70 and annually thereafter (lectures two hours a week, laboratory four hours a week, field course one week).

Members of the Department.

Biology 61.475, History of Biology

A seminar course on the history of biology and biological theory.

Prerequisites: Biology 61.215, a course in physiology at least concurrently and permission of the instructor.

Day Division: 1969-70 and alternate years.

H. H. J. Nesbitt

Biology 61.485, Principles of Systematic Zoology

A course devoted to an intensive study of the principles and methods of animal classification. In the laboratory periods, different animal groups will be studied in different years, e.g., insects in 1968-69.

Prerequisite: Permission of the Department.

Day Division: 1968-69 and alternate years

Biology 61.490, Directed Special Studies and Seminar

Day Division: Annually.

Members of the Department

Biology 61.498, Research Project

Students reading for an Honours degree in Biology may do a research project under the direction of one of the members of the Department.

Prerequisite: Permission of the Department.

Day Division: Annually (subject and laboratory hours to be arranged).

Members of the Department

Graduate Courses

Biology 61.500, Molecular Genetics

A discussion of recent advances and current physico-chemical approaches to the problems of gene organization and function. Seminars and problems.

V. N. Iyer and H. Yamazaki

Biology 61.505, Plant Morphogenesis

A course dealing with problems of the development of plants from single cells to complex multicellular organisms.
Prerequisite: Biology 61.210.
Day Division: 1968-69 and alternate years (lectures two hours a week, laboratory four hours a week).
Margaret McCully

Biology 61.510, Virology

Transmission of viruses by arthropods, the purification of viruses and their relationship to host cells.
Prerequisites: Biology 61.350 and Chemistry 65.220 or 65.222 at least concurrently, and permission of the instructor.
P. E. Lee

Biology 61.520, Advanced Cytology

An analysis of recent developments in the study of cell structure and function.
Prerequisite: Biology 61.420.
G. Setterfield and P. E. Lee

Biology 61.525, Plant Physiology

An advanced course in plant physiology.
Prerequisite: Biology 61.340 or Biology 61.425.
F. Wightman, J. A. Webb and K. W. Joy

Biology 61.530, Plant Biochemistry

An advanced course in plant biochemistry.
Prerequisite: Biology 61.340 or Biology 61.425.
F. Wightman, J. A. Webb and K. W. Joy

Biology 61.535, Advanced Animal Physiology

A course dealing with some of the techniques used, and the concepts in recent advances in animal physiology.
Prerequisite: Biology 61.435.
Lecturer to be announced

Biology 61.540, Experimental Embryology

A lecture and laboratory course dealing with the theory and techniques involved in the elucidation of the interactions which occur during vertebrate development.
Prerequisites: Biology 61.350 and 61.455, and consent of the instructor.
T. W. Betz

Biology 61.542, Endocrinology

An experimental analysis of basic endocrinology, neuroendocrinology and modes of hormone action in vertebrates.
Prerequisites: Biology 61.215, either 61.340 or 61.435 and 61.455.
T. W. Betz

Biology 61.545, Insect Physiology

A course devoted to an advanced study of insect physiology.
Prerequisites: Biology 61.340 and 61.460.

Biology 61.550, Selected Topics

To meet special needs of students, a course in advanced aspects of specialized
biological subjects not covered by other graduate courses may be offered.
Prerequisite: Permission of the Department.
Members of the Department

Biology 61.555, Advanced Insect Morphology

A course devoted to an advanced study of insect morphology and phylogeny.
Prerequisite: Biology 61.460.
H. H. J. Nesbitt

Biology 61.556, Advanced Insect Taxonomy

A course devoted to an advanced study of insect taxonomy.
Prerequisite: Biology 61.460.
H. H. J. Nesbitt

Biology 61.557, Acarology

An advanced course devoted to the Acari (mites).
Prerequisite: Biology 61.460.
H. H. J. Nesbitt

Biology 61.560, Plant Ecology

Prerequisite: Permission of the Department.
Isabel Bayly and J. D. H. Lambert

Biology 61.565, Animal Ecology

Prerequisite: Permission of the Department.
D. A. Smith

Biology 61.566, Insect Ecology

A course dealing primarily with problems and techniques in the analysis of insect
population dynamics.
Prerequisites: Biology 61.340, 61.360 and Mathematics 69.250 or equivalent.
C. A. Barlow

Biology 61.575, Mammalogy

A seminar and laboratory course on the taxonomy, distribution, and ecology of mammals.
Prerequisites: Biology 61.360 and 61.415.
D. A. Smith

Biology 61.580, Plant Taxonomy

Prerequisite: Biology 61.440.
Isabel Bayly

Biology 61.585, Mycology

An advanced course devoted to the morphology, reproduction, taxonomy, and evolution of the fungi.
Prerequisite: Biology 61.400.
W. I. Illman

Biology 61.590, Directed Special Studies and Seminar

Prerequisite: Permission of the Department.
Members of the Department

Biology 61.599, Master's Research and Thesis

Prerequisite: Permission of the Department.
Members of the Department

Biology 61.699, Doctoral Research and Thesis

Prerequisite: Permission of the Department.
Members of the Department

Chemistry

Professor; Chairman of the Department	J. M. Holmes
Professors	C. H. Amberg, R. G. Barradas, P. M. Laughton, J. M. Morton
Associate Professors	J. W. ApSimon (on leave of absence, 1968-69), C. L. Chakrabarti, J. A. Koningstein, C. H. Langford, M. Parris, D. R. Wiles
Assistant Professors	Joyce M. Dunston, P. Kruus, R. A. Shigeishi, C. S. Tsai, R. H. Wightman
Visiting Professor	R. A. Beebe
Sessional Lecturers	G. G. Litvan, Virginia Prince
Senior Demonstrators	R. T. Begley, June Byrne, R. T. Elworthy, Jacqueline Guthrie, Annie Kruus, Marion Moen, R. J. Talbot, Mary Wilkinson.
Postdoctoral Fellows	S. Behrendt, A. V. Bellido, J. Hooper, S. Khorana, L. Majid, O. S. Mortensen, B. Menzel, O. B. Nagy, R. A. Samad, V. S. Sastri.
Teaching Fellows	A. W. Ashbrook, J. J. Rosenfeld, T. L. Slager, S. C. Srinivasan, J. Y. Tang.

General

Students intending to major in Chemistry should have a strong background and interest in Mathematics and Physics. The programs of study can be varied somewhat from those outlined below depending on the interest of the student. However, the following outline represents the basic core of the Chemistry program and any deviation from this must be done in consultation with the Department.

Major Program (minor in Mathematics and Physics)

Year I	Year II	Year III
Chem. 65.100	Chem. 65.210	Chem. 65.250 or 65.220
Physics 75.100	Chem. 65.220 or 65.250	one of Chem. 65.310,
Math. 69.100	A second year Math.	65.320 or 65.350
Biol. 61.100 or	Physics 75.230	An additional Math.
Geol. 67.100	Language	Science Option
Arts Elective		Social Science

Biology or Geology minors would omit the additional Mathematics course in Year III, defer Physics 75.230 to Year III, and choose Biology or Geology courses in Years II and III in consultation with the Department of Chemistry.

All candidates are required to demonstrate a reading knowledge of one of scientific French, German, or Russian.

Honours Program (minor in Mathematics and/or Physics)

Year I—as in Major Program

Year II	Year III	Year IV
Chem. 65.210	two of Chem. 65.310,	remaining 300 Chem. course
65.220	65.320 or 65.350	at least two of 400 Chem.
65.250	an additional Math.	half courses
Physics 75.230	Science Option	Chem. 65.498
Math. Course	Social Science or	Science Option
	Language	Arts course Option

Normally a minor requires four courses. For Biology or Geology minors substitutions as in the Major Program are recommended. Each candidate for Honours is required to demonstrate a reading knowledge of two of scientific French, German, and Russian.

Seminars

Frequent seminars will be presented on research topics by research scientists, graduate students, and final year honours students. Chemistry honours students in Third and Fourth year and all graduate students are required to attend all departmental seminars.

Honours Project

Each candidate for Honours in Chemistry is required as part of Chemistry 65.498 in the final year to carry out a substantial project and to write a report to his supervisor. The report and its defence are heavily weighted in determining the class of honours awarded. The report should be in the departmental office in typewritten form not later than April 15.

Graduate Studies

Graduate studies at the M.Sc. and Ph.D. levels are offered in the Department in the major fields of Chemistry. Normally graduate work in Chemistry must be conducted full-time in residence, and research work must be done in the Department's laboratories under the supervision of the full-time faculty. Candidates for the M.Sc. and Ph.D. degrees are required to present and defend a thesis and demonstrate a reading knowledge of two of scientific French, German, or Russian.

All Ph.D. candidates must pass either oral or written comprehensive examinations at least one year prior to submission of the thesis.

All graduate students are expected to attend all departmental seminars.

Chemistry 65.010, Introductory Chemistry

An introductory course emphasizing the fundamental laws and principles of chemistry. The laboratory course is designed to teach fundamental techniques and to give familiarity with some physical and chemical properties of a selected group of substances.
Text: To be announced.
Day Division: Annually (lectures three hours a week, laboratory three hours a week).
Virginia Prince

Chemistry 65.100, General Chemistry

Gases, liquids, solids, and solutions, chemistry of selected groups of elements and their compounds, including both inorganic and organic compounds; and a qualitative survey of the most important theories used to explain this behaviour: energy relationships, electron structure and the periodic table, quantization of energy, theories of chemical bonding and of chemical reaction. The laboratory course will give training in fundamental techniques and methods of experimental work in analysis, synthesis and other aspects of chemistry.
Text: To be announced.
Prerequisites: Chemistry 65.010 and Mathematics 69.010 and 69.011 or equivalents, and matriculation for the Bachelor of Science degree.
Day and Evening Division: 1968-69 (lectures three hours a week, laboratory three hours a week).
J. M. Holmes, C. H. Langford, and D. R. Wiles

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Chemistry 65.105, General Chemistry

Lecture and laboratory outline the same as Chemistry 65.100 above.
Text: Schaum, *Theory and Problems of College Chemistry*.
Lecture text to be announced.
Prerequisites: Chemistry 65.010 and Mathematics 69.010 or equivalent and enrolment in a program other than for the degree of Bachelor of Science.
Day Division: Annually (lectures three hours a week, laboratory three hours a week).
J. M. Morton

Chemistry 65.210, Introductory Physical Chemistry

The theory of ideal and real gases, liquids, and solutions; phase equilibria; chemical reaction equilibria; chemical kinetics; electrochemistry; surface chemistry; macromolecules. Thermodynamic concepts will be strongly emphasized.
Texts: Moore, *Physical Chemistry*.
Daniels, Mathews and Williams, *Experimental Physical Chemistry*.
Prerequisites: Chemistry 65.100 and Mathematics 69.100 or 69.101.
Day Division: 1968-69 (lectures three hours a week, problems one hour a week, laboratory three hours a week).
C. H. Amberg

Chemistry 65.220, Elementary Organic Chemistry

Structure, synthesis and reactions of the main functional groups with emphasis on aliphatic and simple aromatic systems. An introduction to bonding and mechanisms. The laboratory includes synthesis and characterization of the more important functions and an introduction to modern instrumentation.
Texts: Sykes, *A Guidebook to Mechanism in Organic Chemistry*.
Morrison and Boyd, *A Textbook of Organic Chemistry*.
Prerequisite: Chemistry 65.100.
Day Division: 1968-69 (lectures three hours a week, laboratory four hours a week).
Joyce M. Dunston

Chemistry 65.222, Introductory Organic Chemistry

A course for non-chemistry majors. An introduction to organic chemistry paralleling Chemistry 65.220 but with an introduction to, and emphasis on, the chemistry of biologically important compounds. The laboratory will include some experiments in biological chemistry.
Text: To be announced.
Prerequisite: Chemistry 65.100 or 65.105.
Day Division: Annually (lectures three hours a week, laboratory four hours a week).
Lecturer to be announced.

Chemistry 65.250, Elementary Inorganic and Analytical Chemistry

The chemical principles underlying gravimetric, titrimetric, and instrumental analysis. Elements of bonding theory and descriptive chemistry of typical elements. Laboratory work in gravimetric, titrimetric, and instrumental analysis, and simple inorganic syntheses.
Texts: Bell and Lott, *A Modern Approach to Inorganic Chemistry*.
Day and Underwood, *Quantitative Analysis*, 2nd edition.
Prerequisites: Chemistry 65.100 and Mathematics 69.100 or 69.101.
Day Division: 1968-69 (lectures three hours a week, laboratory four hours a week).
C. L. Chakrabarti
Evening Division: Next offered, 1969-70.

Chemistry 65.300*, Methods of Theoretical Chemistry

Methods of mathematical analysis of interest to chemists including the elements of computer science and its application to problems such as error analysis, matrix calculations, numerical integration, and numerical solutions of differential equations.
Text: To be announced.
Prerequisites: Mathematics 69.201, or 69.205 and 69.245; Chemistry 65.210.
Day Division: Annually (lectures and problems three hours a week, first term).
Lecturer to be announced.

Chemistry 65.310, Physical Chemistry

An introduction to quantum mechanics, and its use in explaining atomic and molecular structure and spectra. Introduction to statistical mechanics and its application to simple systems. Theories of chemical kinetics with applications.
Text: To be announced.
Prerequisites: Chemistry 65.210, Mathematics 69.201 or 69.205*-245*.
Day Division: Annually (lectures three hours a week, problems and laboratory four hours a week).
P. Kruus

Chemistry 65.320, Intermediate Organic Chemistry

Resonance and aromaticity, structure reactivity relationships and conformational analysis. Spectroscopy and its applications. Selected reactions with emphasis on mechanistic rationale and synthetic usefulness. Special topics, e.g. radicals, polymers, heterocycles. The laboratory work will consist of small scale preparations and project-type experiments emphasizing modern techniques.
Text: To be announced.
Supplementary References: Gould, *Mechanism and Structure in Organic Chemistry;* Williams and Fleming, *Spectroscopic Methods in Organic Chemistry.*
Prerequisite: Chemistry 65.220 or 65.222.
Day Division: Annually (lectures three hours a week, laboratory four hours a week).
R. H. Wightman

Chemistry 65.350, Intermediate Inorganic Chemistry

Chemistry of the transition metals. Introduction to coordination compounds: structures, stabilities and reaction mechanisms. Ionic, metallic, and non-stoichiometric compounds. Introduction to radioactivity and its chemical applications. Laboratory work: the synthesis and study of some inorganic compounds and the use of radioactive tracers.
Texts: Douglas and McDaniel, *Concepts and Models of Inorganic Chemistry.*
D. M. Adams and J. B. Raynor, *Advanced Practical Inorganic Chemistry.*
Prerequisites: Chemistry 65.210 and 65.250.
Day Division: Annually (lectures three hours a week, laboratory four hours a week).
M. Parris

Honours Courses

Chemistry 65.410*, Introduction to Quantum Chemistry

Theory of wave function and energy levels of simple and more complicated atoms. Introduction to molecular-orbital theory and group theory.
Prerequisite: Chemistry 65.310 or permission of the instructor.
Day Division: Annually (lectures and seminars three hours a week, first term).
J. A. Koningstein

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Chemistry 65.411*, Statistical Thermodynamics

An introduction to quantum and classical statistical thermodynamics with applications to the theories of solids, liquids, and gases.
Prerequisite: Chemistry 65.310 or permission of the instructor.
Day Division: Annually (lectures and seminars three hours a week, first term).
R. A. Shigeishi

Chemistry 65.412*, Chemical Kinetics

Theories of rates of chemical reaction with application to elementary gas and solution reactions. Complex reactions in gases, solutions and on surfaces.
Prerequisite: Chemistry 65.310 or permission of the instructor.
Day Division: Annually (lectures and seminars three hours a week, second term).
R. A. Shigeishi

Chemistry 65.413*, Colloid and Surface Chemistry

Properties and stability of colloidal systems, theories of absorption, heterogeneous catalysis, and interfacial phenomena.
Prerequisite: Chemistry 65.310 or permission of the instructor.
Day Division: Annually (lectures and seminars three hours a week, second term).
J. M. Holmes

Chemistry 65.420*, Physical Organic Chemistry

Theories of structure; correlations of structure, properties, and reactivity; methods for determining reaction mechanisms.
Prerequisite: Chemistry 65.320 and permission of the instructor.
Day Division: Annually (lectures and seminars three hours a week, first term).
P. M. Laughton

Chemistry 65.422*, Natural Products

Structure proof, synthesis and biogenesis of the major classes of natural products with emphasis on the more modern aspects of the field.
Prerequisites: Chemistry 65.320 and permission of the instructor.
Day Division: Annually (lectures and seminars three hours a week, second term).
Lecturer to be announced

Chemistry 65.423*, Stereochemistry and Synthesis (Organic)

A three dimensional study of carbon compounds including both spatial and electronic effects. Consideration of synthetically useful reactions, their conformational requirements and applications.
Prerequisites: Chemistry 65.320 and permission of the instructor.
Day Division: Annually (lectures and seminars three hours a week, second term).
R. H. Wightman

Chemistry 65.430, Analytical **Chemistry***

Nucleation and precipitation processes. Purity of precipitates. Complexometry. Electrode potentials. Potentiometry. Electrolytic separations and electroanalysis. Polarography. Amperometry.
Reference Texts: Meites and Thomas, *Advanced Analytical Chemistry;* Laitinen, *Chemical Analysis;* Lingane, *Electroanalytical Chemistry.*
Prerequisites: Chemistry 65.210 and 65.250 and permission of the instructor.
Day Division: Annually (lectures and seminars three hours a week, first term).
C. L. Chakrabarti

Chemistry 65.431*, Instrumental Methods of Analysis

Atomic and molecular absorption spectroscopy. Emission spectroscopy. X-ray methods. Mass spectrometry. Differential migration methods—solvent extraction, ion exchange, chromatography.
Reference Texts: Meites and Thomas, *Advanced Analytical Chemistry;* Laitinen, *Chemical Analysis;* Willard, Merritt, and Dean, *Instrumental Methods of Analysis.*
Prerequisites: Chemistry 65.210 and 65.250 and permission of the instructor.
Day Division: Annually (lectures and seminars three hours a week, second term).
C. L. Chakrabarti

Chemistry 65.440*, Biochemistry

Chemistry of biological compounds. Their biological importance and physico-chemical approaches to the study of these compounds. The laboratory includes a special project of biochemical interest.
Prerequisites: Chemistry 65.210 and 65.220 and permission of the instructor.
Day Division: Annually (lectures and seminars three hours a week, first term).
C. S. Tsai

Chemistry 65.441*, Biochemical Energetics

An introduction to enzyme chemistry and bioenergetics. Metabolism of biological compounds and their regulation, biosynthesis of biopolymers and their control. The laboratory includes a special project of biochemical interest.
Prerequisites: Chemistry 65.440* or Biology 61.350 and permission of the instructor.
Day Division: Annually (lectures three hours a week, second term).
C. S. Tsai

Chemistry 65.450*, Applications of Ligand Field Theory

Introduction to quantitative crystal field theory. The weak field approximation and application to heats of ligation. The strong field approximation and application to spectra and magnetism.
Prerequisites: Chemistry 65.310 and 65.350.
Day Division: Annually (lectures three hours a week, first term).
M. Parris

Chemistry 65.451*, Metal-organic Chemistry

Chemistry of some low-valent transition metal compounds; nitrosyl, carbonyl, hydride, and hydrocarbon complexes.
Prerequisite: Chemistry 65.350.
Day Division: Annually (lectures three hours a week, second term).
M. Parris

Chemistry 65.452*, Radiochemistry

A study of nuclear stability and decay; chemical studies of nuclear phenomena. Selected laboratory experiments are optional.
Reference Text: Friedlander, Kennedy, and Miller, *Nuclear and Radiochemistry*.
Prerequisite: Chemistry 65.350.
Day Division: Annually (lectures and seminars three hours a week, second term).
D. R. Wiles

Chemistry 65.498, Research Project and Seminar

Senior students in Honours Chemistry will carry out a research project under the direction of one of the members of the Department.
Day Division: Annually.

Graduate Courses

Chemistry 65.510, Quantum Chemistry

J. A. Koningstein

Chemistry 65.511, Structure and Dynamics in Liquids

P. Kruus

Chemistry 65.512, Chemical Kinetics

Lecturer to be announced

Chemistry 65.513, Surface Chemistry and Catalysis

C. H. Amberg and R. A. Shigeishi

Chemistry 65.520, Physical Organic Chemistry

P. M. Laughton

Chemistry 65.522, Natural Products Chemistry

Lecturer to be announced

Chemistry 65.523, Synthetic Organic Chemistry

R. H. Wightman

Chemistry 65.530, Analytical Chemistry

C. L. Chakrabarti

Chemistry 65.540, Biochemistry of Enzyme Action
C. S. Tsai

Chemistry 65.550, Inorganic Chemistry
M. Parris

Chemistry 65.555, Nuclear Chemistry
D. R. Wiles

Chemistry 65.590, Directed Special Studies
Members of the Department

Chemistry 65.599, Master's Research and Thesis
Members of the Department

Chemistry 65.699, Doctoral Research and Thesis
Members of the Department

Classics

Professor; Chairman of the Department	A. Trevor Hodge
Professor	F. Ellenor M. Swallow
Assistant Professors	D. G. Beer, A. S. Fotiou, R. Jeffreys (St. Patrick's College), T. R. Robinson (on leave of absence, 1968-69), M. E. Welsh
Lecturers	R. C. Blockley (on leave of absence, 1968-69), J. Trainor (St. Patrick's College)

Qualified students may read for Honours in Classics, or students may elect Latin, or Greek, or a combination of the two as their major field of study in a Pass course; or students who are reading for honours in another discipline may elect either Latin or Greek as a minor field of interest.

Combined Major work or Honours work in either Greek or Latin and another discipline may be arranged upon consultation with the departmental chairmen concerned.

Major in Classics

Major in Latin: 5 Latin courses to be chosen in consultation with the department; Classics 14.490; Classical Civilization 13.201.

Major in Greek: 5 Greek courses to be chosen in consultation with the department; Classics 14.490; Classical Civilization 13.200.

Major in Classics:

Emphasis on Latin: 4 Latin and 3 Greek courses to be chosen in consultation with the department; Classics 14.490.

Emphasis on Greek: 4 Greek and 3 Latin courses to be chosen in consultation with the department; Classics 14.490.

Note: A general examination, either written or oral, will be given to all students in the final year of a "major" program, in addition to the regular course examinations.

Honours Course

First year Arts

The general requirements for First year Arts will be fulfilled, but with the following possibilities:

1) A student may be recommended to postpone one requirement until Second year in order to take both Greek and Latin from the beginning of his university course.

2) If his past record so warrants he may be recommended to take a sixth course, thus accomplishing the balance of languages from the start and the reduction of course load in the final year when he is preparing for a general examination.

Second, Third and Fourth years:

Emphasis on Latin:

5 further courses in Latin.

Classical Civilization 13.201 (Roman history), or 13.309 (Greek and Latin literary forms), or 13.320 (Social and economic history), or 13.429.

Classics 14.490 (Seminar).

3 further courses in Greek.

4 options.

Emphasis on Greek:

5 further courses in Greek.

Classical Civilization 13.200 (Greek History), or 13.309 (Greek and Latin literary forms), or 13.320 (Social and economic history), or 13.429.

Classics 14.490 (Seminar).

3 further courses in Latin.

4 options.

A student may instead elect to take five courses each of Latin and Greek (over the four years); and either Classical Civilization 13.200 or 13.201 or 13.309 or 13.320 or 13.429; Classics 14.490 (Seminar); 4 options. (In any case, a fifteenth course, in the appropriate grouping for the student's own course pattern, will be necessary, if five courses and not six were taken in First year Arts).

Total: Twenty courses in four years, of which at least twelve must be classical.

Note: At the end of an honours course, students will be required to take a comprehensive examination, either written or oral, to test their general knowledge in the field of Classics. Although no specific grade will be assigned here, a student will not be recommended for the degree unless he has passed this examination satisfactorily. Also, it will be taken into consideration, along with all work done in the Classics department, in the awarding of first, high second, second, or third class honours.

Graduate Studies

A program of studies leading towards a master's degree in Classics is now available. For general regulations see p. 88. Within the department the degree may be sought in one of three categories: Classics, or Greek only, or Latin only. For details consult the departmental chairman.

Offerings for 1968-69 are as follows:

Greek 15.015, Introduction to Language and Reading

A beginning course to introduce students not only to grammar and syntax, but also to the reading of continuous prose.
Day Division: 1968-69 (lectures and practice periods four hours a week).
J. Trainor
Summer: 1968 *Day Division* (lectures ten hours a week).
W. J. Watts

Greek 15.100, Literature and Reading

Study of the forms and development of Greek literature. Reading in one prose author and one poet. Some time will also be devoted to prose composition.
Prerequisite: Greek 15.015 or the equivalent.
Day Division: 1968-69 (lectures three hours a week).
A. T. Hodge

Greek 15.150, Composition and Sight Translation

A study of continuous prose composition and sight translation of prose and verse authors.
Prerequisite: Greek 15.100 or the equivalent.
Day Division: 1968-69.
A. S. Fotiou

Greek 15.240, The Orators

Not offered, 1968-69.

Greek 15.260, Philosophy

A study of the rise and development of Greek philosophy, with special attention to the literary qualities of the chief authors.
Prerequisite: A 100 course or permission of the Department.
Day Division: 1968-69.
R. Jeffreys

Greek 15.280, The Tragedians
Not offered, 1968-69.

Greek 15.300, History
Not offered, 1968-69.

Greek 15.320, Homer
Not offered, 1968-69.

Greek 15.410, Comedy
Not offered, 1968-69.

Greek 15.420, The Lyric Poets
Not offered, 1968-69.

Latin 16.010, Language and Reading

Review of grammar and syntax; composition. Reading: selections from various authors in prose and verse.
Prerequisite: Junior Matriculation Latin or the equivalent. Students without preparation in Latin will not be admitted to this class.
Day Division: 1968-69 (lectures three hours a week).

Latin 16.100, Literature and Reading

Study of the history of Latin literature. Reading: Selections from various authors throughout the classical period.
Prerequisite: Latin 16.010 or the equivalent.
Day Division: 1968-69 (lectures three hours a week).
Ellenor Swallow and D. G. Beer
Summer: 1968 *Day Division* (lectures ten hours a week).
A. S. Fotiou

Latin 16.150, Composition and Sight Translation

A study of continuous prose composition and sight translation of prose and verse passages.
Prerequisite: Latin 16.010 or the equivalent.
Day Division: 1968-69 (two tutorial hours a week).
M. E. Welsh

Latin 16.260, The Historians
Not offered, 1968-69.

Latin 16.280, Virgil
Not offered, 1968-69.

Latin 16.340, Lyric and Elegy
Readings in Horace and the other chief authors of the genre.
Prerequisite: A 100 course or permission of the Department.
Day Division: 1968-69 (two tutorial hours a week).
M. E. Welsh

Latin 16.360, The Letter-writers
Not offered, 1968-69.

Latin 16.380, Comedy and Satire
Not offered, 1968-69.

Latin 16.410, Oratory
Not offered, 1968-69.

Latin 16.420, Philosophy
Not offered, 1968-69.

Seminar

Classics 14.490, Special Problems
Required of students taking their major work, or reading for Honours, in Classics.
Prerequisite: Permission of the Department.
Day Division: 1968-69 (two tutorial hours a week).

Classical Civilization 13.200, Greece in the Ancient World
The history and civilization of classical Greece with special attention to the develop-
ment of her characteristic institutions. (This course is also listed as History 13.200).
Day Division: 1968-69 (lectures two hours a week). This course will be given in the
day and evening divisions in alternate years.
A. S. Fotiou
Summer: 1968 *Evening Division* (lectures five hours a week).
R. Jeffreys

Classical Civilization 13.201, Rome in the Ancient World
The history of ancient Rome, her growth and expansion, and her organization during
the Republic and the early Empire. (This course is also listed as History 13.201).
Evening Division: 1968-69 (lectures two hours a week). This course will be given in
evening and day divisions in alternate years.

Classical Civilization 13.309, Greek and Latin Literary Genres
A study through English translations of the various *genres* of Greek and Latin
literature, especially those which influenced later European writing: epic, drama, the
ode, pastoral poetry, satire. (This course is also listed as English 13.309).
Day Division: 1968-69 (lectures two hours a week).
D. G. Beer

Classical Civilization 13.310, Greek Literature in Translation

The development of Greek literature and literary forms from Homer to the Hellenistic period, with extensive reading of Greek authors in English translation.
Not offered, 1968-69.

Classical Civilization 13.311, Latin Literature in Translation

The development of Latin literature and literary forms from the earliest times to the early Empire, with extensive reading of Latin authors in English translation.
Not offered, 1968-69.

Classical Civilization 13.320, A Social and Economic Survey of the Ancient World

A study of ancient religion, politics, law, trade, slavery, and other institutions characteristic of Greek and Roman society.
Not offered, 1968-69. This course will be alternated with Classical Civilization 13.330.

Classical Civilization 13.330, Classical Art and Archaeology

A study of the material remains of the ancient world from Minoan Crete and early Greece to the Roman Empire, with special attention to pottery, sculpture, painting, and architecture.
Evening Division: 1968-69 (lectures two hours a week). This course will be alternated with Classical Civilization 13.320.
A. T. Hodge

Classical Civilization 13.429, Selected problems in Greek and Roman history

Not offered, 1968-69.

Graduate Courses

The following graduate courses will become available as required over the next few years.
Classics 14.501 Mediaeval Latin
Classics 14.505* Introduction to linguistics (half course)
Classics 14.506* Elementary text criticism (half course)
Classics 14.510 (Greek) and *14.511* (Latin) Advanced composition
Classics 14.520 (Greek) and *14.521* (Latin) An author in depth
Classics 14.530 (Greek) and *14.531* (Latin) A literary period or genre, in depth
Classics 14.540 (Greek) and *14.541* (Latin) The literary critics and theorists
Classics 14.599 Thesis (for the M.A. — two-course equivalent)

Of these, in 1968-69 the following will be offered:

Classics 14.505*, Introduction to linguistics
A. S. Fotiou

Classics 14.506*, Elementary text criticism
A. S. Fotiou

Classics 14.511, Advanced Prose Composition (Latin)
D. G. Beer

Classics 14.521, Virgil
Ellenor Swallow

Economics

Professors	T. N. Brewis, H. E. English, S. F. Kaliski, S. May
Associate Professor; Chairman of the Department	W. I. Gillespie
Associate Professors	R. Caterina (Accounting), G. E. Clarke (St. Patrick's College), K. A. J. Hay, N. H. Lithwick, Kanta Marwah, G. Paquet, T. K. Rymes, W. R. Scott (Accounting), J. B. Waugh (Accounting) (on leave of absence, 1968-69)
Assistant Professors	R. L. Carson, E. U. Choudhri, W. Fobes (St. Patrick's College), S. K. Ghosh, C. L. Johnson, Leon N. Ledohowski (Accounting), C. McMillan, Jr., Soo Bin Park (St. Patrick's College), G. Rich
Sessional Lecturers	S. Elliott, P. J. Faulkner (Accounting), T. Kerr, N. G. Ross (Accounting), W. F. Ryan, S.J., G. P. Wilson (Accounting)

The Economics courses are divided into six categories

1. Economics 43.100—to be taken in First year.
2. Basic courses in theory, economic history and statistics. Economics 43.200, 43.210, 43.225, (or 43.325), and 43.220—appropriately taken in Second year.
3. Second or Third year options—courses numbered 325-399.
4. Senior options—courses numbered 400-484—normally taken in Third or Fourth year (also see Graduate Studies).
5. Special honours courses—courses numbered 485-499—for honours students only.
6. Graduate seminars and thesis—courses numbered 500 and higher.

Major Courses

Students seeking admission to the major or honours programs in Economics will normally be expected to have credits in Grade 13 Mathematics (both papers) or the equivalent. Mathematics 69.101 is a requirement in the First year.

A student will normally be permitted to major in Economics only if he or she obtained a 60% grade in Economics 43.100.

Students who major in Economics will take at least six Economics courses—categories 1 and 2 and at least one course from category 4. One of the category 2 courses may be postponed to Third year. The student's program for the Second and Third years must be approved by the Chairman of the Department of Economics.

Honours Courses

Honours courses may be entered from the Honours first year in the Social Sciences (see p. 53), or by transfer from the major course if University regulations for entry (see p. 47) have been met. The student's program for the second and subsequent years will be planned in consultation with the Chairman of the Department. The student will also be assigned an individual faculty adviser.

The honours requirements include the required courses in categories 1 and 2, and at least two from category 4. In his final year the student will also fulfil two requirements qualitatively different from the others: the Tutorial in Modern Classics (43.490) and the Honours Essay (43.498). A grade of at least 66% will be required in the honours essay. Honours students, including combined honours students, will take a comprehensive examination (written and oral) at the end of the final year.

For purposes of determining an honours student's standing at graduation, all Economics courses, except Economics 43.100, will be considered. The comprehensive examination will be given a weight of 1.

Combined Honours in Economics and Political Science

Students intending to take this course should take Economics 43.100 or Political Science 47.100 (or preferably both) in the First year. The choice of courses in subsequent years will be subject to the approval of the chairmen of the two departments. The honours requirements include at least six courses in Economics and six courses in Political Science, one of which must be Political Science 47.498 or Economics 43.498, to be taken in the student's final year. These will be arranged so that the student may transfer either to full honours in Political Science or to full honours in Economics at the end of the Third year, if he then wishes to specialize more intensively. Students must also meet the language requirements of the Department of Political Science.

Combined Honours in Economics and Mathematics

Students will have a choice of a combination of Economics and Pure Mathematics or Economics and Statistics. In either case, they will take seven courses in Economics and eight in Mathematics and meet the two departments' requirements for comprehensive examinations. Each year's program should be determined in consultation with the two departments.

The Economics courses taken shall be: Economics 43.100, 43.200, 43.210, 43.225 or 43.325, 43.400 or 43.492, 43.498 and one other in category four. The Mathematics courses taken in the first two years shall be Mathematics 69.100, 70.200, 70.210, and 70.257*. Those of the final two years shall be *either* Mathematics 70.245*, 69.300, 70.310, 69.307* and one and one-half courses at the 300 level and 400 level, *or* Mathematics 69.350, 69.357* and 69.358* and two and one-half courses at the 300 and 400 level.

Consideration will also be given to applications for Combined Honours in Economics and History, and Economics and Sociology.

Graduate Studies

The Department of Economics offers studies leading to the degree of Master of Arts in both day and evening divisions.

Admission Requirements

Students normally enter the First year of this program if they have a Carleton University Honours B.A. degree in Economics or its equivalent in both content and standing. Applicants are expected to have had an adequate preparation in mathematics and statistics, to the extent of having passed courses comparable to Mathematics 69.100 or 69.101 (linear algebra, differential and integral calculus) and Economics 43.220 (probability theory, statistical analysis, correlation and regression analysis), as listed in the Carleton University calendar. If students have deficiencies in these or any other respects, they must be made up to the satisfaction of the Department during the first year of enrolment.

Students with pass degrees, honours degrees in disciplines other than economics, or major deficiencies in their undergraduate training will normally be expected to enter a Qualifying M.A. year, prior to admission to the first year of full graduate study.

Course Requirements

There are two avenues leading to the M.A. degree:

(a) Degree by course work:

Students are required to pass *five* courses in the first year of graduate studies. These courses must include Economics 43.500, 43.510*, and 43.520, plus two others drawn from Economics 43.525 and the 400-level courses (in which additional work may be assigned).

(b) Degree through course work and thesis:

Students are required to pass Economics 43.500, 43.510*, and 43.520. A thesis[1] equivalent to two courses must be written. Thesis topics must be chosen in fields in which a member of the Department is prepared to supervise the work.

Residence Requirements

Candidates for the M.A. degree are accepted on both part-time and full-time bases. Part-time students can only proceed to the degree through a program of course work and thesis preparation (see (b) above), and they must be prepared to take their courses in the daytime if necessary. Full-time students must spend one year in residence.

Graduation Requirements

The Department requires that candidates for the M.A. degree achieve a grade of 66% or better in each course, comprehensive examination, and thesis (where relevant) as a prerequisite for graduation. Candidates taking the five course M.A. program and who wish to proceed to the Ph.D. may postpone taking their comprehensives until the end of the first year of their Ph.D. program.

The Department of Economics intends to offer studies leading to the degree of Doctor of Philosophy, commencing in the Fall of 1969.

Admission Requirements

Students are admitted to the Ph.D. program providing they have completed their first full year of graduate study at the University with no less than a grade of 70% in each course. Admission to the program is also open to those who have an M.A. or equivalent degree in economics, with standings no less than 70%, from another accredited university.

Course Requirements

Second year graduate students are required to take Economics 43.600, 43.610*, and 43.620, plus two other 600-level courses to be decided upon in consultation with the Chairman of Graduate Studies in Economics.

Thesis Requirements

Third year graduate students will undertake a Doctoral dissertation equivalent to five course credits.

Residence Requirements

Ph.D. students will normally spend three years in full-time residence, unless they are exempted one year by virtue of an appropriate Master's degree or equivalent. The third year may, by special permission, be spent at another university or approved institution.

Graduation Requirements

Candidacy for the degree of Doctor of Philosophy will be offered only to those students who have completed their two year course requirements (one year beyond M.A., or equivalent) plus comprehensive examinations with no less than 70% in all final standings. The Doctoral degree will be awarded to a candidate upon completion and oral defence of the dissertation.

[1] A candidate in the final M.A. year is asked to note that if he wishes to receive his degree at the Spring Convocation following his registration in the previous Fall, four copies (see pp. 88-90) of his thesis must be submitted to the Department at least eight weeks prior to Convocation.

General Admission Requirements

Applicants whose mother tongue is not English will normally be required to write the University of Michigan English Language Test. At the discretion of the Department, certain applicants will be required to write the Graduate Record Examinations Aptitude Test *and* the advanced test in Economics offered by the Educational Testing Service.

Economics 43.010, Economics and Society

An introduction for Colombo Plan students to the concepts and ideas of political economy. Other students from overseas may be admitted with the permission of the instructor.
Day Division: 1968-69 (lectures and discussion groups, three hours a week).
T. N. Brewis

Economics 43.100, Principles of Economics

An introduction to the concept of economic welfare and its relation to society's other economic goals, e.g., the efficient use and allocation of resources, an appropriate rate of growth of production, and stability in output, employment and prices. The basic principles and statistical measures used in examining these goals and the means of achieving them are discussed. Public policies affecting the distribution of income, the control of monopoly, and the maintenance of stability in employment and prices are also discussed.
Day Division: Annually (lectures and classes, four hours a week).
Evening Division: Annually (lectures and classes, four hours a week).
G. E. Clarke, W. I. Gillespie, N. H. Lithwick, and G. Rich
Summer Session: 1968 *Evening Division* (lectures and classes six hours a week).
W. I. Gillespie

Economics 43.200, Price Theory

The modern analysis of production and distribution with special reference to the determination of the conditions which maximize social welfare. The major courses of departure from the social welfare optimum in a full employment economy, with particular attention to imperfections in competition.
Prerequisite: Economics 43.100.
Day Division: Annually (lectures two hours a week).
R. L. Carson, C. L. Johnson
Summer Session: 1968 *Evening Division* (lectures five hours a week).
R. L. Carson

Economics 43.210, Aggregate Economic Theory and Policy

An examination of modern macroeconomic theory, with special reference to domestic and international monetary theory. A survey of Canadian and international financial institutions and arrangements. A critical examination of macroeconomic problems and the policies advocated for their solution.
Prerequisite: Economics 43.100.
Day Division: Annually (lectures two hours a week).
Evening Division: Annually (lectures two hours a week).
G. Rich, C. McMillan, E. U. Choudhri
Summer Session: 1968 *Evening Division* (lectures five hours a week).
T. Kerr

Economics 43.220, Statistical Methods in the Social Sciences

An introduction to the principal statistical measurements. The use of statistical analysis as a method for the precise and reliable acquisition of knowledge in the social sciences will be stressed. The misuse of statistical information will be examined. (This course is listed also as Sociology 53.205). Economics 43.220 will yield a half credit only, if Mathematics 69.250 has been taken for credit and will yield no credit if Psychology 49.205 has been taken for credit. Credit for both Economics 43.220 and Mathematics 69.257 may be had only by permission of the departments.
Prerequisites: Mathematics 69.010 and one of Economics 43.100, Political Science 47.100, Sociology 53.100; or the permission of the instructor.
Day Division: Annually (lectures two hours a week, laboratory two hours a week).
Evening Division: Annually (lectures two hours a week, laboratory two hours a week).
K. Marwah, S. May, G. Paquet

Economics 43.225, Economic History

An examination of the development of economic institutions, especially those aspects of history which may be used to explain the character of the principal economic institutions and practices of the present day. (This course is also listed as History 43.225).
Prerequisite: Economics 43.100, or the permission of the instructor.
Evening Division: 1968-69 (lectures two hours a week).
T. K. Rymes

Economics 43.321*, National Accounting

An introduction to the modern social accounting framework encompassing the national product accounts, the input-output accounts, and national transactions accounts, with emphasis on Canadian practice. Attention will be paid to new developments such as national wealth accounts, constant dollar accounts, productivity measurement and an examination of the Social accounts for underdeveloped and socialist countries.
Prerequisite: Economics 43.100.
Day and Evening Divisions: 1968-69 (lectures two hours a week).
T. K. Rymes

Economics 43.325, The Economic Development of Canada

An examination of the development of the Canadian economy with emphasis on the post-Confederation period. Attention will be focused on the changing patterns of internal and external factor and commodity flows, productivity, and technological change. Frequent comparisons with U.S. economic development will be made. (This course is also listed as History 43.325).
Prerequisite: Economics 43.100 or History 24.230 or 24.235.
Day Division: 1968-69 (lectures three hours a week).
G. Paquet

Economics 01.330, Social Economics

An examination of some of the ways in which public authorities attempt to reshape the economic environment towards a greater conformity to social values. The objectives and practice of social security schemes, housing policy, "the war on poverty" etc. will be considered.
Prerequisite: Economics 43.100.
(This course is offered by the Department of Economics only at the St. Patrick's campus)

Economics 43.335, Political Economy in the Modern State

Prerequisites: Economics 43.100, Political Science 47.100, and a further course in either Economics or Political Science.
Not offered, 1968-69.

Economics 43.340, Problems of Area Development

A seminar on the location of economic activity and the problems of those areas lagging behind in economic development, with particular reference to the Canadian scene. Measures to improve the lot of these areas and the rationale of the underlying public policy.
Prerequisites: Economics 43.100 and the permission of the instructor.
Evening Division: 1968-69 (lectures two hours a week).
T. N. Brewis

Economics 43.345, Agricultural Economics

An examination of the agricultural industry in the national economy and in low income societies. The course will emphasize the working out of the basic forces which determine supply-demand for the industry and the functional distribution of income among the factors of production. The place of institutions will be examined and public policy will be critically reviewed.
Prerequisite: Economics 43.100.
Day Division: 1968-69 (lectures two hours a week).
S. K. Ghosh

Economics 43.350, Business Finance

A study of the financial aspects of business operations. Topics include the flow of funds within the business, planning for short- and long-term needs for funds, capital structure, expansion and reorganization; the markets for long- and short-term capital.
Prerequisites: Economics 43.100 and Accounting 41.100.
Day Division: 1968-69 (lectures three hours a week).
L. Ledohowski

Economics 43.355, Labour Economics and Industrial Relations

An examination of labour as a factor of production with regard to the origin of a rational labour market and its structure, function, and the policy implications thereof with respect to both 'perfect' and 'imperfect' markets. The development of an industrial relations system; the theory, structure, and function of trade unions; their history and public policy towards them; and an evaluation of them as institutions.
Prerequisite: Economics 43.100.
Not offered, 1968-69.

Economics 01.300, Labour Economics

(Offered during 1968-69 only at the St. Patrick's campus).
C. L. Johnson

Economics 43.360, International Economics

An introduction to a wide range of economic problems arising from international trade and balance of payments aspects. These problems will be analyzed by developing and applying simple tools which are usually discussed in a principles course in Economics. Emphasis is placed upon existing problems and institutions that are relevant for an understanding of current economic relations among countries.
Prerequisite: Economics 43.100.
Evening Division: 1968-69 (lectures two hours a week).
E. U. Choudhri

Economics 41.365, Computer Technology Applied to Commerce Problems

Introduction to digital computer organization and operations. Programming techniques, stressing the use of FORTRAN IV and COBOL. Numerical solution to problems of interest in social and management sciences. Simulation of business problems *and* the use of business strategies.
(This course is also listed as Accounting 41.365).
Prerequisites: Mathematics 69.101 and Economics 43.220 or permission of the instructors.

Economics 43.366*, Economics of Planning

An examination of the theoretical problems of economic planning both at the micro and at the macro levels. Investigation of the equilibrium and optimality conditions of centrally directed economic systems. Study of programming techniques and an attempt to establish the foundations of a theory of rational macrodecision. Some economics of information.
Prerequisites: Economics 43.200 and 43.210 or permission of the instructor.
Not offered, 1968-69.

Economics 43.370, The Soviet Economy

The analysis of the Soviet economy from the point of view of questions significant to the economist. Essentially a discussion of the method of determining wants and the structure through which they are implemented, i.e., the plan, the price system, the method of balances (including input-output and linear programming), investment choice, the organization and structure of industry and agriculture, financial and non-financial controls and incentives. The unique nature and problems of the Soviet economy will be discussed.
Prerequisite: Economics 43.100; further work in Economics would be highly desirable.
Day Division: 1968-69 (lectures two hours a week).
C. McMillan

Economics 43.400, Mathematical Economics and Econometrics

An introduction to some of the simpler mathematical models of economic theory and to estimates based upon them. Both aggregative and micro-economic models will be considered. Attention will be divided between formal aspects of the models and estimating procedure. Students will be assumed to have an adequate knowledge of elementary calculus and simpler algebra, but other mathematical tools will be developed as they are needed.
Prerequisites: Economics 43.200 and 43.220; Mathematics 69.100 or 69.101; and the permission of the instructor.
Day Division: 1968-69 (lectures three hours a week).
S. May

Economics 43.405, Quantitative Methods in Economics and Business

An integration of statistical methods and micro-economic analysis with applications to business and economic decision-making. Special emphasis will be laid upon techniques such as Linear Programming, Non-linear Programming, Game Theory, Waiting Line Theory, Sequencing Theory, Simulation, Inventory Control Systems, and Decision Theory.
Prerequisites: Economics 43.200, 43.220; Mathematics 69.100 or 69.101.
Day Division: 1968-69 (lectures and seminars two hours a week).
S. K. Ghosh

Economics 43.410, Finance and Capital Markets

The workings and structure of Canada's capital markets with particular reference to differing classes of institutional lenders and borrowers; relationships of non-bank financial intermediaries to the banking system, regulatory agencies and the public, the impact of these institutions on corporate financial and national economic policy, access to foreign capital markets, and external financing of Canadian economic development.
Prerequisite: Economics 43.210.
Evening Division: 1968-69 (lectures and seminars two hours a week).
K. A. J. Hay

Economics 43.415, History of Economic Thought

The crucial achievements in economic theory and doctrine in the nineteenth and twentieth centuries are studied. Special emphasis is given to the interrelationship between the social environment and economic thought — especially to the role of economics in the development of the national state and international institutions.
Prerequisites: Economics 43.200 or 43.210, or permission of the instructor.
Day Division: 1968-69 (lectures and seminars two hours a week).
T. K. Rymes

Economics 43.420, Seminar in Applied Economics

A selection of empirical studies chosen on the basis of their importance and the group's interests will be examined critically and, if possible, extended. Active and intensive participation will be required.
Prerequisites: Economics 43.220 and one of 43.200 or 43.210 and permission of the instructor.
Day Division: 1968-69 (Seminar two hours a week).
S. F. Kaliski, Kanata Marwah

Economics 43.430, Industrial Organization and Public Policy

An analysis of the organization of Canadian industry, with reference to associated U.S. industry where necessary. A few representative industries are examined in some detail. Price theory is used to distinguish economic from institutional factors affecting the structure of the economy. Emphasis is laid upon public policies which affect, intentionally or otherwise, the organization and behaviour of industry, e.g., public utility regulation, control of restrictive practices, commercial policy, and price supports.
Prerequisite: Economics 43.200.
Not offered, 1968-69.

Economics 43.440, Public Finance

Prerequisite: Economics 43.200 or 43.210.
Not offered, 1968-69.

Economics 43.445, Capital and Growth

An examination of theories of growth and capital accumulation.
Prerequisite: Economics 43.210.
Not offered, 1968-69.

Economics 43.450, Economic Fluctuations and Stabilization Policy

An analysis of the nature and causes of fluctuations in income, employment and prices, and related government policy. Some consideration of the problems and techniques involved in economic forecasting.
Prerequisite: Economics 43.210.
Not offered, 1968-69.

Economics 43.455, Economic Growth and Development

1968-69, *Economic Growth and Development*
An inquiry into the theories and processes of modern economic growth and development. Following an introduction to the key theoretical tools, the analysis will focus on the experience of Western Europe, Russia and Japan and then attempt to relate this experience to that of today's underdeveloped countries. Emphasis will be placed on the interaction of cultural change and economic development as well as on the unique geographical and historical situation in each of the countries studied.
Prerequisite: Economics 43.210.
Evening Division: 1968-69 (lectures and seminars two hours a week).
W. F. Ryan, S.J.

Economics 43.460, International Trade

An examination of the theory of international trade and payments and its applications. The current body of theory and its historical development are discussed, as are a number of attempts to verify and quantify the theory. A number of present day problems, policies, and institutions are examined in the light of the theory and empirical findings.
Prerequisites: Economics 43.200 and 43.210.
Evening Division: 1968-69 (lectures and seminars two hours a week).
S. F. Kaliski

Economics 43.470, Comparative Economic Systems

A discussion of the structure and functioning of economic systems in theory and practice. Some criteria for evaluating economic performance will be proposed. Such actual contemporary economies as those of the U.S.S.R., U.S.A., France, Yugoslavia, and China will be examined.
Prerequisite: Economics 43.200; Economics 43.210 should have been taken, or be taken concurrently; or permission of the instructor.
Day Division: 1968-69 (lectures two hours a week).
R. Carson

Economics 43.480, Research Seminar in Urban Economics

An inquiry into the internal dynamics of cities and inter-urban relationships primarily through directed research.
Prerequisites: Economics 43.200 and 43.220.
N. H. Lithwick and G. Paquet

Economics 43.490, Tutorial in Modern Classics

An honours student will be expected, usually in his final year, to read a group of original works selected in consultation with a member of the Department assigned as tutor. The student will meet regularly with his tutor to discuss his readings and to read papers based upon it.
Prerequisite: Permission of the Chairman of the Department.
Day Division: Annually (tutorial hours arranged)
Soo Bin Park

Economics 43.492, Tutorial in Economics

An additional tutorial in economics may be taken subsequent to or concurrently with Economics 43.490.
Prerequisite: Permission of the Chairman of the Department.
Day Division: Annually.

Economics 43.498, Honours Essay

A student taking honours in economics must write an honours essay during his final year. This essay will count for one course credit.
Prerequisite: Permission of the Chairman of the Department.

Graduate Courses

a) First Year Courses

Economics 43.500, Economic Theory[1]

A rigorous examination of advanced micro and macro theory sufficient to serve as a basis of the program. The student will be required to draw upon a variety of mathematical concepts as the need arises.
Day Division: 1968-69.
E. U. Choudhri and G. Rich

[1]This course is equivalent to a one and a half course load.

Economics 43.505, Quantitative Methods

This course is required for students whose statistical training is judged to be inadequate (p. 129). It will cover the fundamental concepts of statistical analysis and will introduce the student to econometric methods.
Day Division: 1968-69.
Kanta Marwah

Economics 43.510*, Workshop in Economic Policy

Intended primarily to provide students and faculty with an opportunity to think and work together on policy questions. It is viewed as being an avenue for several members of the Department to discuss their research, especially as related to current policy problems, with graduate students.
Day Division: 1968-69.
K. A. J. Hay and Members of the Department

Economics 43.520, The Canadian Economy

A detailed examination of various aspects and related problems of the Canadian economy. Included will be an examination of a number of the following items:
a) the economic development of Canada, and national and regional development policies;
b) the industrial structure and policy to control and promote competition;
c) the structure of factor markets and related policies;
d) the stability of the Canadian economy, and the role of monetary and fiscal policies;
e) the role of international trade and capital movements and related policies.
Day Division: 1968-69.
H. E. English, W. I. Gillespie

Economics 43.525, Advanced Economic History

A discussion of methodology applicable to the analysis of economic history. Intensive examination of selected topics in North American and West European economic history.
Not offered, 1968-69.

Economics 43.599, M.A. Thesis

b) Second Year Courses[1]

Economics 43.600, The Structure of Economic Policy

A fairly abstract analysis of the theoretical foundations of policy that would be sufficiently general to extract the crucial relationships among various policies. To include an examination of the formulation, objectives, role, and interrelationships of economic policy.

Economics 43.610*, Workshop in Economic Policy

See Economics 43.510*.

[1]The second year courses will not be offered during 1968-69.

Economics 43.620, Research Seminar in Economics

A forum for the discussion of the specific research interests of the students. The earlier part of the course includes a discussion of research techniques and particularly recent developments in such techniques.

Candidates can select from the following list of advanced courses, which may be half or full courses, depending on the topic covered. The courses presented below indicate the areas in which members of the Department are prepared to supervise directed reading, research, and seminars, although not all of the courses will necessarily be offered in any one year.

Economics 43.615, Advanced Course in History of Economic Thought

Economics 43.630, Advanced Course in Industrial Organization and Public Policy

Economics 43.635, Advanced Course in Labour Market Theory and Industrial Relations

Economics 43.640, Advanced Course in the Theory of Public Finance

Economics 43.645, Advanced Course in Theories of Capital and Economic Growth

Economics 43.650, Advanced Course in Economic Fluctuations and Stabilization Policy

Economics 43.655, Advanced Course in Economic Growth and Development

Economics 43.660, Advanced Course in International Economics

Economics 43.665, Advanced Course in Economic Theory

Economics 43.670, Advanced Course in Comparative Political Economy

Economics 43.681*, Seminar in Micro Economics

Economics 43.682*, Seminar in Macro Economics

Economics 43.683*, Advanced Topics in Econometrics

Economics 43.684*, Seminar in Economic History

c) Third Year Courses

Economics 43.699, Ph.D. Thesis

Engineering

Undergraduate Studies

Candidates for the Bachelor of Engineering degree are required to complete a program of study covering four years after Senior Matriculation. The admission requirements and programs of study for each of the four years are outlined on pp. 76-79.

Engineering 81.110, Mechanics I

Composition and resolution of forces and force systems; principles of equilibrium; analytical and graphic determination of forces in simple frame structures; suspended cables; center of gravity and centroids; friction; three-dimensional statics; work; potential energy; stability.
Lectures two hours a week, both terms.
Text: Langhaar and Boresi, *Engineering Mechanics*.
E. B. Fletcher and C. D. Holmes

Engineering 81.211, Mechanics II

Kinematics and dynamics of a particle; momentum principles; kinematics and dynamics of rigid bodies; principles of work and energy.
Lectures three hours a week, second term.
Problem analysis three hours a week, second term.
Text: Meriam, *Dynamics*
Reference: Beer and Johnston, *Mechanics for Engineers*.
G. W. Bigg, P. Janzen and J. C. Vrana

Engineering 81.220, Mechanics of Materials I

Stress; strain; factor of safety; Hooke's Law for normal and shearing stresses; Poisson's ratio; torsion of circular, rectangular and thin-walled members; membrane analogy for torsion; stress concentrations; shear force and bending moment diagrams; flexural and shear stress in beams; shear in beams; deflection of beams by double integration; combined axial and bending stresses: plane stress and strain; Mohr's circle; principal stresses and strains; thin-walled pressure vessels; elastic buckling; introduction to electrical resistance strain gauges.
Lectures three hours a week, first term.
Problem analysis and laboratory three hours a week, first term.
Text: Byars and Snyder, *Engineering Mechanics of Deformable Bodies.*
Reference: Higdon, Olsen and Stiles, *Mechanics of Materials.*
D. A. Kasianchuk, G. T. Suter and J. C. Vrana

Engineering 81.321, Mechanics of Materials II

Statically indeterminate problems in tension and compression, thermal stresses, concentrically and eccentrically loaded connections with rivets, bolts or welds in shear or tension; plastic bending of beams, beams of two materials, unsymmetrical bending, shear center; deflection due to unsymmetrical bending, deflection due to shear; introduction to strain energy; statically indeterminate problems in bending by the method of superposition, continuous beams with elastic supports or settlement of supports; the Euler formula for columns, effective column length, the tangent modulus formula, the secant formula, design formulae for columns; lateral buckling of beams; design for combined compression and bending; triaxial stresses, failure theories; the effect of high and low temperatures on metals; fatigue.
Lectures two hours a week, second term.
Problem analysis and laboratory three hours a week, second term.
Text: Timoshenko and Young, *Elements of Strength of Materials.*
Reference: Popov, *Mechanics of Materials.*
P. Janzen, R. F. Manuel and G. T. Suter

Engineering 81.411, Introduction to Solid Mechanics

Basic considerations of stress and strain. Introductory elasticity, selected topics from the theory of; beams, curved beams, stability, plates, stress concentrations, fatigue, torsion. Numerical and experimental stress analysis.
Lectures two hours a week, first term.
Problem analysis three hours alternate weeks, first term.
Text: Housner and Vreeland, *The Analysis of Stress and Deformation.*
References: Juvinall, *Stress, Strain and Strength.*
Dally and Riley, *Experimental Stress Analysis.*
G. W. Bigg

Engineering 82.422, Structural Analysis

Review of plane statics; advanced analysis of statically determinate plane trusses; moving loads and influence lines; statically determinate space structures; guyed towers; analysis of elastic systems by energy methods; deflection of trusses by graphical and analytical methods; statically indeterminate pin-jointed trusses; analysis of rigid frames with prismatic or haunched members by slope deflection and moment distribution; arches; analysis of rigid frames for plastic design; elementary treatment of elastic stability of columns, beams and plates.

Lectures three hours a week, first term; two hours a week, second term.
Laboratory three hours alternate weeks, both terms.
Text: Timoshenko and Young, *Theory of Structures*.
Reference: Norris and Wilbur, *Elementary Structural Analysis*.
R. F. Manuel

Engineering 82.423, Reinforced Concrete

Properties of concrete; mix design and use of admixtures; curing requirements, shrinkage; creep and temperature effects; ultimate strength and working stress; analysis and design of rectangular beams with tension and compression reinforcement and T beams; diagonal tension; bond; design of web reinforcement; two way and flat slabs; yield-line theory for slabs; concentrically and eccentrically loaded columns; footings; introduction to prestressed concrete.

Lectures three hours a week, second term.
Problem analysis and laboratory three hours a week, second term.
Text: Winter, Urquhart, O'Rourke and Nilson, *Design of Concrete Structures*.
References: Ferguson, *Reinforced Concrete Fundamentals*.
National Building Code of Canada, Part 4—Design.
A.C.I. Building Code Requirements for Reinforced Concrete.
G. T. Suter

Engineering 82.425, Design of Structural Components

Determination of loads; factors of safety; properties of structural steels; the design of axially loaded tension and compression members; design of rolled steel shapes in flexure; design of simple and eccentric, welded and bolted connections; design of welded and bolted splices; design of members with combined compression and flexure; design of moment resisting connections, base plates.

Lectures three hours a week, first term.
Problem analysis three hours alternate weeks, first term.
Text: McGuire, *Steel Structures*.
Reference: National Building Code of Canada.
CISC Handbook of Steel Construction.
W. Wright

Engineering 82.426, Design of Steel Structures

Structural loads and design procedures; design of plate girders, built-up compression members and trusses, rigid frames; design of bridges, single and multi-storey buildings; plastic design; economic considerations and cost estimates.

Lectures two hours a week, second term.
Problem analysis three hours alternate weeks, second term.
Text: McGuire, *Steel Structures*.
References: National Building Code of Canada
CISC Handbook of Steel Construction
CSA Standard S6-1966-Design of Highway Bridges.
W. Wright

Engineering 82.428, Foundation Engineering

Procedures for the analysis, design and construction of foundations and earth structures, with emphasis on the relationship between theoretical soil mechanics and soils engineering.
Lectures two hours a week, second term.
Problem analysis three hours alternate weeks, second term.
Text: Teng, *Foundation Design*.
References: Terzaghi and Peck, *Soil Mechanics in Engineering Practice*.
Peck, Hanson and Thornburn, *Foundation Engineering*.
D. A. Kasianchuk

Engineering 83.424, Soil Mechanics

Identification and classification; soil structure and clay mineralogy; void ratio, water content and unit weight relationships; compaction; neutral and effective stresses; permeability flow nets; one-dimensional consolidation; stress distribution; shear strength; stability of slopes; earth pressure.
Lectures three hours a week, first term.
Laboratory three hours alternate weeks, first term.
Text: Terzaghi and Peck, *Soil Mechanics in Engineering Practice*.
References: Taylor, *Fundamentals of Soil Mechanics*.
Bishop and Henkel, *The Measurement of Soil Properties in the Triaxial Test*.
E. B. Fletcher

Engineering 84.104, Surveying

Surveying principles and practice; measurements of distance, difference in elevation, angles and directions; theory, use and adjustments of principal surveying instruments; theory of errors and weighted measurements; engineering surveys, profile, cross sections, earthwork, horizontal and vertical curves; use of rectangular coordinates in surveying; area computation by surveying methods; principles of aerial photo-grammetry. Handling of equipment, note-keeping, and surveying procedures are stressed in the field work.
Lectures and field work three weeks at the end of the second term.
Text: Davis, Foote and Kelly, *Surveying: Theory and Practice*, 5th edition.
Lecturer to be announced

Engineering 84.429, Highway Engineering

Highway planning, economics and finance; highway location and geometric design; traffic engineering; highway drainage and subgrade structure; structural analysis and design of rigid and flexible pavements; mineral aggregates; bituminous mix design; principles of frost action and applications to highway design.
Lectures two hours a week, first term.
Laboratory and problem analysis three hours alternate weeks, second term.
Text: Oglesby and Hewes, *Highway Engineering*.
References: Ritter and Paquette, *Highway Engineering*.
Woods, *Highway Engineering Handbook*.
Yoder, *Principles of Pavement Design*.
D. A. Kasianchuk

Engineering 84.433, Urban Planning

A study of the structure and functions of an urban community. Planning surveys, elements of the development plan, land use zoning, requirements and location of industry, commercial and residential development, and the role of transportation are studied. Theories for urban growth and regional development are discussed.
Lectures two hours a week, first term.
Laboratory and problem analysis three hours alternate weeks, first term.
References: Webster, *Urban Planning and Municipal Public Policy*.
Walker, *The Planning Function in Urban Government*.
Gallian, *The Urban Pattern*.
Local Planning Administration.
C. D. Holmes

Engineering 84.434, Transportation

General function of transportation; objectives of transportation systems and transportation planning; historical, administrative and financial status of various modes of Canadian transportation; planning, design and economic evaluation of transportation systems; urban transportation needs, study and forecasting techniques, plan preparation and evaluation.
Lectures two hours a week, second term.
Laboratory and problem analysis three hours alternate weeks, second term.
References: Owen, *Strategy for Mobility*.
Hall, *A Methodology for Systems Engineering*.
Hutchinson, et al., *Planning Urban Transportation Systems*.
Oglesby and Hewes, *Highway Engineering*.
C. D. Holmes

Engineering 86.270, Introduction to Materials Engineering

Crystallography—space lattices, planes and directions in crystals. Crystal structures of the elements and some binary alloys. Phase diagrams, the phase rule, solid solutions, ordering and clustering. Changes of state—solidification, zone refining, the eutectic and peritectic systems. Solid state transformations—the martensite and eutectoid transformations, reaction rates and precipitation hardening. Imperfections in crystals, vacancies, dislocations, grain boundaries. Plastic deformation. Semiconductor materials.
Lectures three hours a week, second term.
Problem analysis and laboratory three hours a week, second term.
Text: Richman, *An Introduction to the Science of Metals*.
M. J. Bibby and J. A. Goldak

Engineering 86.471, Materials Engineering

Analysis of failure due to fatigue, wear and corrosion. Forming, fabrication and joining of materials.
Lectures two hours a week, first term.
Laboratory three hours alternate weeks, first term.
Reference: Dieter, *Mechanical Metallurgy*.
Recent publications.
J. A. Goldak

Engineering 86.475, Electrical Materials

Examination of crystals by x-ray, electron, and neutron diffraction. Vacancies and diffusion. Introductory wave mechanics, electronic energy levels in atoms, molecules and solids. Static electron properties of metals. Electrical and thermal conductivities of metals. Semiconductors. Magnetic and dielectric materials.
Lectures two hours a week, first term.
Laboratory three hours alternate weeks, first term.
Text: Hutchison & Baird, *The Physics of Engineering Solids.*
M. J. Bibby

Engineering 87.100, Engineering Drawing and Geometry

Selection and use of instruments; lettering; applied geometry; orthographic projection; freehand and instrument drawing; auxiliary and oblique views; sections and conventions; pictorial sketching and drawing including isometric, oblique and perspective; dimensions and notes, including precision and limit dimensions; screw threads; fasteners; use of piping and welding symbols; detail and assembly drawings; elements of structural drawings; descriptive geometry including point, line, plane problems, curved and warped surfaces, intersections and developments; use of reference books, handbooks and catalogues; introduction to simplified practice in engineering drawing.
Lectures one hour a week, both terms.
Laboratory five hours a week, both terms.
Texts: French and Vierck, *Engineering Drawing,* 10th edition.
Wellman, *Technical Descriptive Geometry,* 2nd edition.
E. N. King

Engineering 87.312, Mechanics of Machines I

Introduction to mechanisms; simple, compound and epicyclic gear trains; static and dynamic balance—rotors and reciprocating engines; mechanical vibration—free and forced vibration, damping, systems having one and two degrees of freedom.
Lectures three hours a week, first term.
Text: Phelan, *Dynamics of Machinery.*
References: Timoshenko, *Vibration Problems in Engineering.*
Ham, Crane and Rogers, *Mechanics of Machinery.*
G. W. Bigg and J. C. Vrana

Engineering 87.401, Mechanical Analysis and Design

Approach to design; stress analysis; design factors; properties of materials; stress concentration, notch sensitivity and fatigue; curved beams; columns with axial and transverse loading; power screws; screw fastenings and connections subject to variable loads; shafts; funicular polygon method of determining the elastic curve and critical speed of shafts, general case; springs; journal and plane bearings; rolling bearings; belt and chain drives; spur, helical, bevel, hypoid and worm gearing; couplings, brakes and clutches.
Lectures two hours a week, both terms.
Problem analysis three hours alternate weeks, both terms.
Text: Faires, *Design of Machine Elements.*
References: Merritt, *Gears.*
Dudley, *Practical Gear Design.*
Shigley, *Mechanical Engineering Design.*
Spotts, *Design of Machine Elements.*
E. N. King

Engineering 88.414, Vibration Analysis

Multi-degrees of freedom systems; the flexibility and transfer matrices, orthogonality principles, sweeping matrices for lower modes, Holzer type problems, branched systems, electrical analogs and mobility methods. Continuous systems; longitudinal, torsional and flexural free and forced vibrations of prismatical bars. Vibrations of membranes and plates. Vibration measurements and analysis of records.
Lectures two hours a week, first term.
Laboratory three hours alternate weeks, first term.
References: Thomson, W. T., *Vibration Theory and Applications*.
Timoshenko, *Vibration Problems in Engineering*.
P. Janzen

Engineering 88.437, Mechanics of Flight

Introduction to mechanics of flight; elements of theoretical and experimental aerodynamics; aerodynamic characteristics of airfoils and wings at low and high speeds, airplane drag estimation; performance characteristics of propulsive systems; airplane performance analysis including take-off, landing, rate of climb, maximum speed, range, endurance, etc.; static stability and control problems and analysis.
Lectures three hours a week, first term.
Prerequisite: Engineering 89.330 or equivalent.
References: Dommasch, Sherby and Connolly, *Airplane Aerodynamics*.
Etkin, *Dynamics of Flight*.
Miele, *Flight Mechanics* Vol. I: *Theory of Flight*.
J. Ruptash

Engineering 88.447, Heating, Ventilating and Air Conditioning

Comfort. Environmental demands for residential, commercial and industrial systems. Methods of altering and controlling environment. Air distribution. Refrigeration methods, equipment and controls. Integrated year-round air-conditioning and heating systems; heat pumps. Cooling load and air-conditioning calculations. Thermal radiation control. Component matching. System analysis and design.
Lectures two hours a week, second term.
Problem analysis three hours alternate weeks, second term.
Text: Stoecker, *Refrigeration and Air-conditioning*.
Reference: Carrier, Cherne, Grant and Roberts, *Modern Air-conditioning, Heating and Ventilating*.
G. W. Goodkey

Engineering 88.452, Control Systems and Instrumentation

Transfer functions, block diagram algebra, stability, steady state errors, types of control systems, root-locus method, frequency response, Bode construction, Nichol's charts, Nyquist stability criterion; servomechanism equalization; modes of control. Study of basic pneumatic and hydraulic control loops for level, position, speed, and inertial guidance controls with emphasis on the response of the transducers and instruments' response. Laboratory activities will include the synthesis and analysis of control loops and components.
Lectures two hours a week, first term.
Laboratory three hours a week, first term.
References: Welbourn, *Essentials of Control Theory for Mechanical Engineers*.
Raven, *Automatic Control Engineering*.
C. R. Thompson

Engineering 89.330, Fluid Mechanics

Fundamental concepts; properties of fluids; fluid statics; fluids in relative equilibrium; fundamental equations for steady one-dimensional nonviscous incompressible flow; selected applications; dimensional analysis, dynamic similarity; laminar flow, turbulent flow, boundary layer, skin friction, and drag estimation; pipe line problems; open channel flow; one-dimensional steady isentropic flow, shock waves; elements of two-dimensional steady nonviscous incompressible flow.
Lectures two hours a week, both terms.
Laboratory three hours alternate weeks, both terms.
Text: Binder, *Fluid Mechanics,* 4th edition.
Reference: Streeter, *Fluid Mechanics.*
F. W. Black and R. J. Kind

Engineering 89.431, Hydrology

Hydrologic cycle; stream flow, hydrology of snow; subsurface water, hydraulics of wells; unit hydrograph and S-curve analysis of flood flows; infiltration, river and reservoir routing; introduction to statistical inference and time series analysis of hydrologic data.
Lectures two hours a week, first term.
Laboratory three hours alternate weeks, first term.
Text: Butler, *Engineering Hydrology.*
References: Chow, *Handbook of Applied Hydrology.*
DeWeist, *Geohydrology.*
Linsley, Kohler and Paulhus, *Hydrology for Engineers.*
Wisler and Brater, *Hydrology.*
Lecturer to be announced

Engineering 89.432, Fluid Dynamics

Equations of fluid dynamics for elementary control volume in common coordinate systems. Incompressible nonviscous flow. Compressible steady nonviscous flow: isentropic one-dimensional flow; normal and oblique shock waves; expansion waves; wave interaction and reflection; introduction to unsteady flow. Viscous flow: Navier-Stokes equation; Poiseuille flow; Couette flow; hydrodynamic lubrication: boundary layers; Blasius solution; approximate methods and solutions; drag; boundary layer growth and stability; separation; control techniques.
Lectures three hours a week, first term.
References: Shapiro, *Dynamics and Thermodynamics of Compressible Fluid Flow,* Vol. 1.
Eskinazi, *Principles of Fluid Mechanics.*
E. G. Plett

Engineering 89.435, Fluid Machinery

Purposes and types of fluid machines. Hydrostatic, hydrodynamic machines. Performance parameters; dimensional analysis and similarity. Performance testing. Effect of inlet conditions, cavitation, compressibility and viscosity. The Euler Pump and Turbine Equation. Velocity diagrams, reaction. Axial flow machines; propellers, turbines, fans, compressors. Radial and mixed flow machines; pumps, turbines, entry and exit volutes. Torque converters and fluid couplings; hydraulic transmissions. Fluid handling systems and system component matching. Equilibrium and transient running points. System dynamics and stability with parallel and series operation. Water hammer, collapse of penstocks.
Lectures two hours a week, second term.
Laboratory three hours alternate weeks, second term.
References: Shepherd, *Principles of Turbomachinery*.
Kovats, *Design and Performance of Centrifugal and Axial Flow Pumps and Compressors*.
Norrie, *An Introduction to Incompressible Flow Machines*.
A.S.M.E., *Cavitation in Fluid Machinery*.
Lecturer to be announced

Engineering 89.436, Hydraulic Structures

Open channel flow; channel transitions and controls; arch, earth and gravity dams; spillways, weirs, gates and culverts; mechanics of sedimentation in reservoirs and rivers; fluvial morphology and river engineering.
Lectures two hours a week, second term.
Problem analysis and laboratory three hours alternate weeks, second term.
Text: Morris, *Applied Hydraulics in Engineering*.
References: Blench, *Regime Behaviour of Canals and Rivers*.
Chow, *Open-Channel Hydraulics*.
Creager, Justin and Hinds, *Engineering for Dams*.
Linsley and Franzini, *Water Resources Engineering*.
Lecturer to be announced

Engineering 90.340, Thermodynamics

Basic concepts of heat, work, temperature, property, state, system, control volume. The First Law for systems and control volumes with applications, Properties of pure substances, phase diagrams. The Perfect gas laws and relations. The Second Law and its corollaries, entropy from classical and statistical approach. Introduction to Kinetic theory of gases. Properties of gas mixtures.
Lectures three hours a week, first term.
Problem analysis and laboratory three hours a week, first term.
Text: Spalding and Cole, *Engineering Thermodynamics,* 2nd edition.
F. W. Black, R. C. Biggs and E. G. Plett

Engineering 90.341, Introduction to Heat Transfer

Analytical, analog and numerical methods of determining temperature distribution and heat flow in regions with steady-state heat conduction in one and two dimensions. Transient heat conduction problems. Heat exchange by radiation between black and grey surfaces; solar radiation. Heat transfer to fluids flowing through ducts. Free and forced convection at cylindrical and plane surfaces. Boiling and condensation. The lectures are supplemented by laboratory experiments.
Lectures two hours a week, second term.
Laboratory three hours alternate weeks, second term.
Text: Kreith, *Principles of Heat Transfer.*
R. C. Biggs, E. H. Dudgeon and E. G. Plett

Engineering 90.442, Applied Thermodynamics

Properties and processes of gases and vapours; development and use of property charts and tables. Psychrometry, combustion. Heat engine cycles and plants: vapor cycles; steam power plants, compression and absorption refrigerators; desalination; gas cycles; internal combustion engines, gas turbine engines, air cycle refrigerators. Elements of propulsion plants; turboprops, turbofans, turbojets; rockets. Principles of turbomachines. Power system analysis, component matching and off-design perform-ance estimation.
Lectures three hours a week, both terms.
Laboratory three hours a week, second term.
References: Jones and Hawkins, *Engineering Thermodynamics.*
Haywood, *Analysis of Engineering Cycles.*
Soo, *Thermodynamics of Engineering Science.*
D. A. J. Millar

Engineering 90.443, Energy Conversion

An assessment of the energy needs of the world and of presently-known methods of energy utilization. Fundamentals of irreversible thermodynamics and of solid-state theory. Principles of operation of nuclear reactors, fusion reactors, thermoelectric energy converters, thermionic energy converters, fuel cells, magnetoplasmadynamic power generators and solar cells.
Lectures three hours a week, second term.
Laboratory three hours alternate weeks, second term.
Text: Angrist, *Direct Energy Conversion.*
References: Littler and Raffle, *An Introduction to Reactor Physics.*
Rose and Clark, Jr., *Plasmas and Controlled Fusion.*
G. D. Cormack

Engineering 93.351, Fundamentals of Electric Circuits

An introduction to the theory of linear passive networks. Strong emphasis is placed on Laplace transform methods for circuit analysis. Topics include transient analysis, generalized solutions, poles and zeros, transfer functions, Bode and Nyquist diagrams, loop and node analysis, super-position, Thevenin's and Norton's theorems, treatment of initial conditions and sinusoidal steady state analysis.
Lectures three hours a week, first term.
Laboratory and problem analysis three hours a week, first term.
Text: Del Toro, *Principles of Electrical Engineering.*
M. A. Copeland, G. D. Cormack and B. Paqurek

Engineering 93.357, Electronics I

Diodes and diode circuits. Vacuum tubes and their equivalent circuits. Transistors and their equivalent circuits. Small signal amplifiers. Oscillators. Large signal circuits. Survey of the principal electronic systems.
Lectures three hours a week, second term.
Laboratory three hours alternate weeks, second term.
Text: Del Toro, *Principles of Electrical Engineering.*
D. C. Coll, J. P. Knight and J. S. Riordon

Engineering 93.458, Electronics II

Diode gates, AND, OR, NAND and NOR. Voltage sweeps; linearity and synchronization. Multivibrators, blocking oscillators, power converters. The properties of linear active quadripoles, input and output admittance, stability criteria, optimum power gain and unilateralisation. Small signal narrow-band amplifiers. Large signal amplifiers, audio and radio-frequency. Oscillators. Modulation and modulating systems. Frequency changing, limiting, demodulation.
Lectures two hours a week, first term; three hours a week, second term.
Laboratory three hours a week, first term, three hours alternate weeks, second term.
Text: Gibbons, *Semiconductor Electronics.*
References: S.E.E.C. Volumes 4, 6 and 7.
Schwartz, *Information Transmission, Modulation and Noise.*
M. A. Gullen

Engineering 94.451, Signal Processing

Mathematical representations for signals, Laplace transforms, series expansions, Fourier transforms, amplitude and phase spectra, power spectra, convolution and correlation methods, signal sampling. Amplitude, frequency and phase modulation, demodulation, suppressed band systems, multiplexing, noise spectra, signal detection in the presence of noise.
Lectures three hours a week, second term.
References: Lathi, *Signals, Systems and Communication.*
Javid and Brenner, *Analysis, Transmission and Filtering of Signals.*
G. D. Cormack

Engineering 94.455, Feedback Control Systems

Review of Laplace Transformation methods. Dynamics of control system components. Objectives of automatic control. Block diagrams. Complex plane techniques. Stability. Root locus. Compensation. Frequency response methods.
Lectures three hours a week, first term.
Text: Clark, *Introduction to Automatic Control Systems.*
J. S. Riordon

Engineering 94.456, Feedback Control Laboratory

Experimental determination of system characteristics by step, a.c. steady state and general excitation testing. Compensation design. A.C. Systems. Component characteristics and selection. Effects of common nonlinearities. Laboratory work involves the use of the analogue computer, measurements on d.c. and a.c. control systems, and system design. Electrical, electromechanical and mechanical control systems may be studied.
Lectures one hour a week, second term.
Laboratory three hours a week, second term.
Reference: Clark, *Introduction to Automatic Control Systems.*
B. Pagurek

Engineering 95.065, 1620 Fortran Programming

A half course open to arts and science students of the second and more senior years. Limited to sixty students. Successful completion of this course involves substantial effort. Students are advised to consider, carefully, their total academic commitments during the term before registering. (Half Course)
Day Division: Annually (lectures and workshop three hours a week, one term).
J. D. MacDonald

Engineering 95.265, Introduction to Computer Programming

Introduction to the IBM 1620 Data Processing System. Machine organization: the stored program, addressing, branching, looping. The IBM 1620 machine language. Programming with the FORTRAN language. Numerical methods: roots of transcendental equations, finite difference approximations, forward integration. Matrix methods: multiplication, inversion, solution of simultaneous equations.
Lectures one hour a week, both terms.
Laboratory one hour a week, both terms.
Text: McCormick and Salvadori, *Numerical Methods in Fortran*.
Lecturers to be announced

Engineering 95.360, Introduction to Computer Science

Number systems, data representation and storage. Arithmetic operations, electronic gates and registers. Digital computer organization; command and address structure; machine languages. Symbolic languages. Compilers; FORTRAN and ALGOL, COBOL, Non-numeric processing, ALPAK and FORMAC. Flow-charts and their symbolism. Algorithms. Iteration and recursion. Computational errors. Students are assumed to have an elementary knowledge of Boolean algebra. (Half Course)
Text: Wegner, *Introduction to System Programming*.
Day Division: Annually (lectures three hours a week, laboratory two hours a week, second term).
M. A. Gullen

Engineering 95.366, Computer Applications

Analysis of engineering problems with the use of the digital computer, including mathematical modelling, organization of the equations, and methods of solution using analytical and numerical methods. Topics in numerical methods include: solution of single algebraic and transcendental equations and sets of linear algebraic equations, determination of eigen values and eigen vectors; curve fitting by difference and least squares methods; numerical integration, differentiation; solution of ordinary and partial differential equations. These methods are illustrated by application to typical engineering problems. An important part of the course is the analysis and solution, by the student, of a substantial engineering problem, using the IBM 1620 or GE 415 computer.
Lectures three hours a week, first term.
Text: James, Smith and Wolford, *Applied Numerical Methods*.
References: Salvadori and Baron, *Numerical Methods in Engineering*.
Crandall, *Engineering Analysis*.
J. P. Knight and D. A. J. Millar

Engineering 95.466, Switching Circuits

Set theory, propositional calculus, Boolean algebra. Switching devices; diodes, transistors, magnetic cores. Analysis and synthesis of single and multiple output combinational circuits; minimisation methods, the Karnaugh map. Codes and code-processing networks, error-detecting and error-correcting codes. Introduction to sequential circuits; analysis; cycles, races and hazards. The synthesis of fundamental-mode sequential circuits; primitive and merged flow tables, secondary assignment, race-free and hazard-free network design.
Lectures three hours a week, first term.
Text: McCluskey, *Introduction to the Theory of Switching Circuits.*
D. C. Coll

Engineering 96.468, Solid State Electronics

After a review of the fundamentals of solid state physics, the more common electronic devices are studied, such as switching and zener diodes, transistors, thin film components, integrated circuits, Hall effect devices, magnetic cores, varactors. Particular emphasis is placed on the derivation of equivalent circuit models.
Lectures three hours a week, first term.
Laboratory three hours alternate weeks, first term.
Text: Gibbon, *Semiconductor Electronics.*
A. R. Boothroyd

Engineering 97.453, Electric Transmission and Radiation

Introduction to guided waves. Transient and steady-state solution of the transmission line equations. Properties of transmission lines, standing waves, impedance; effect of loading. Impedance charts, matching techniques. Lines at radio frequencies. Lines at power frequencies. Waveguides and cavities. Radiation from charge and current distributions, antennas. Near and far field of a radiator, approximations. Wire antennas, gain directivity. Introduction to arrays and apertures.
Lectures three hours a week, second term.
Laboratory three hours alternate weeks, second term.
Text: Jordan, *Electromagnetic Waves and Radiating Systems.*
References: Atwater, *Introduction to Microwave Theory.*
Ryder, *Networks, Lines and Fields.*
W. Makios

Engineering 97.454, Electromagnetic Fields

Vector analysis. The concept of fields. Gradient, divergence, curl and Laplacian. Divergence theorem, Stoke's theorem, Green's theorems. Electrostatic fields, Coulomb's law, Gauss' law, Poisson and Laplace equations. Image and iteration techniques. Boundary value problems. Force and energy. Magnetostatic fields, Ampere's laws, Biot-Savart law. Time varying fields, Maxwell's equations. Reflection and refraction of plane waves.
Lectures three hours a week, first term.
Text: Plonsey and Collin, *Principles and Applications of Electromagnetic Fields.*
References: Reitz and Milford, *Foundations of Electromagnetic Theory.*
Hayt, *Engineering Electromagnetics.*
W. Makios

Engineering 98.361, Introduction to Electric Machines

Elements of three phase circuits and power systems transformers, Fourier analysis, fundamental alternating and direct current machines. The direct current machine is modelled and studied in transient and steady state situations and with feedback. Block diagram manipulation and analogue computer simulation.
Lectures three hours a week, second term.
Laboratory three hours alternate weeks, second term.
Text: Del Toro, *Principles of Electrical Engineering*.
M. A. Copeland, J. P. Knight and W. Makios

Engineering 98.462, Electrical Machines

Force and torque in electromechanical devices, for dielectric and magnetic, from stored energy and circuit principles. Dielectric and magnetic microphones, reluctance machines, the rotating field approach, the circuit approach, synchronous machines, synchronous machine dynamics, the induction machine, two axis direct current machines, the generalized machine.
Lectures two hours a week, second term.
Reference: Chapman, *Electromechanical Energy Conversion*.
M. A. Copeland

Engineering 99.497, Engineering Project

As a part of the fourth year program, each student is required to select and complete a major project in engineering analysis, design, development or research. The objective is to provide an opportunity to develop initiative, self reliance, creative ability, and engineering judgement. The results must be submitted in a comprehensive report with appropriate drawings, charts, bibliography, etc. Each student is required to submit his engineering project proposal to the Dean of Engineering on or before October 1.
Members of the Faculty

Graduate Studies

The Faculty of Engineering offers courses of graduate study leading to the M.Eng. and Ph.D. degrees in the fields of Aeronautical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering and Materials Engineering. The regulations governing graduate studies are outlined on pp. 80-82 and 88-89.

Engineering 81.520, Theory of Elasticity

Stress-strain relationships. Plane stress and plane strain. Two dimensional problems in rectangular and polar coordinates. Strain energy methods. Analysis of stress and strain in three dimensions. General theorems. Three dimensional problems. Thermal stresses.
Lectures three hours a week, both terms.
References: Timoshenko and Goodier, *Theory of Elasticity*.
Wang, *Applied Elasticity*.
C. R. Thompson

Engineering 81.521, Theory of Plasticity

Yield criteria and associated flow rules. Limit analysis. Applications to deformation, residual stress and fracture in bars, beams and tubes.
Lectures three hours a week, second term.
Reference: Hill, *Mathematical Theory of Plasticity*.
Not offered, 1968-69.

Engineering 81.522, Theory of Plates and Shells

Circular and rectangular plates with small deflections; introduction to large deflection theory of plates; membrane theory of shells; bending of shells of revolution and cylindrical shells.
Lectures three hours a week, first term.
Reference: Timoshenko and Woinowsky-Krieger, *Theory of Plates and Shells*.
P. Janzen

Engineering 81.527, Experimental Stress Analysis

Photoelasticity: two-dimensional stress fields, models, types of polariscope, the shear difference method, relaxation solution of Laplace's equation, oblique incidence, isotropic points. Three-dimensional stress fields, frozen patterns, scattered light analysis. Formulae for photoelastic coating; photoelastic strain gauges. Gauge factors, loading effects on strain gauge bridges, balancing, cross and null balance sensitivity, calibration and temperature compensation. Models and analogues, soap film. Moire fringes, brittle lacquer, mechanical and optical strain gauges.
Lectures three hours a week, first term.
References: Frocht, *Photoelasticity*.
Dally and Riley, *Experimental Stress Analysis*.
Durelli and Riley, *Introduction to Photomechanics*.
G. W. Bigg

Engineering 82.523, Theory of Structural Stability

General stability theory—discrete and continuous systems. The general eigenvalue problem. Introduction to the calculus of variations. Approximate methods. Topics from; beam columns; bars and frames; curved beams; thin-walled beams; plates and shells.
Lectures three hours a week, second term.
Prerequisite: Engineering 82.525 or equivalent.
References: Timoshenko and Gere, *Theory of Elastic Stability*.
Langhaar, *Energy Principles in Applied Mechanics*.
G. W. Bigg

Engineering 82.525, Analysis of Elastic Structures

Use of the force method and the displacement method for the analysis of a variety of indeterminate structures including frames, arches and two- and three-dimensional trusses; matrix analysis of indeterminate structures; use of models; influence lines for indeterminate structures.
Lectures three hours a week, first term.
Reference: Hall and Woodhead, *Frame Analysis*.
W. Wright

Engineering 82.526, Behaviour of Steel Structures

Bolted connections under static and dynamic load. Welded connections under static and dynamic load. Brittle fracture and its control. Ultimate strength of columns and beam-columns. Lateral and local buckling of members designed for plastic behaviour. Plastic behaviour of multi-storey frames subject to sidesway, behaviour of thin-webbed girders. Introduction to the behaviour of orthotropic plate structures.
Lectures three hours a week, second term.
Reference: McGuire, *Steel Structures.*
W. Wright

Engineering 82.527, Advanced Structural Design

Structural aesthetics; load analysis; earthquake resistant design; advanced concepts of design with examples; design project.
Lectures three hours a week, second term.
References: Nervi, *Structures.*
Blume, et al., *Design of Multistory Reinforced Concrete Building Frames for Earthquake Motions.*
Lecturer to be announced

Engineering 82.528, Advanced Reinforced Concrete

Ultimate strength and behaviour of reinforced concrete members. Current research and recent North American and European practice. Reinforced concrete members subjected to flexure, axial compression, combined flexure and axial load, combined flexure and shear; bond.
Lectures three hours a week, first term.
R. F. Manuel

Engineering 82.529, Prestressed Concrete

Influence of creep and shrinkage; analysis and design of tension members, pretensioned and post-tensioned beams; prestressing methods; friction losses, continuous beams.
Lectures three hours a week, first term.
References: Leonhardt, *Prestressed Concrete.*
Lin, *Prestressed Concrete Structures.*
Kani, *Prestressed Concrete.*
G. T. Suter

Engineering 83.528, Foundation Engineering — Case Histories

Study of selected case histories: limitations in methods of exploration, testing and design in foundation engineering. Site investigation: effects of absence of completeness. Bearing capacity and settlement: unsuitable foundations and superstructures, assessment of the effects of loads. Failures due to defective execution: dewatering, excavation, construction. External influences on foundation behavior: groundwater, scour, slides, frost action, swelling of clays.
Lectures three hours a week, first term.
References: Terzaghi, *From Theory to Practice in Soil Mechanics.*
Selected papers.
Lecturer to be announced

Engineering 83.530, Advanced Soil Mechanics I

Clay mineralogy and physical chemistry of soils; effective stress, elastic equilibrium, pore pressure parameters; saturated and partially saturated soils; seepage, consolidation and settlement; shear strength.
Lectures three hours a week, first term.
References: Scott, *Principles of Soil Mechanics*.
Wu, *Soil Mechanics*.
E. B. Fletcher

Engineering 83.531, Advanced Soil Mechanics II

Plasticity in soil mechanics, failure and yield criteria, plastic equilibrium, upper and lower bound solutions, statically admissible and kinematically admissible states, stability analysis for cohesive and cohesionless soils, bearing capacity, soil dynamics.
Lectures three hours a week, second term.
References: Wu, *Soil Mechanics*.
Scott, *Principles of Soil Mechanics*.
E. B. Fletcher

Engineering 83.532, Advanced Soil Mechanics III

Design of earth and rock-fill embankments, retaining structures, soil stabilization. Foundations including footings, rafts, piles, piers, caissons. Field instrumentation.
Lectures three hours a week, second term.
Reference: Leonards, *Foundation Engineering*.
D. A. Kasianchuk

Engineering 84.533, Pavement Design

Characterization of highway and airport traffic loads; stresses and load distribution in single and multi-layer flexible and rigid pavements; pavement behaviour under static, transient and repeated loads; interpretation and application of strength properties of subgrade soils and paving materials; theoretical and empirical design methods for flexible and rigid highway and airport pavements; pavement performance evaluation; pavement test roads; current research developments.
Lectures three hours a week, second term.
References: Yoder, *Principles of Pavement Design*.
Ann Arbor International Conference on Structural Design of Asphalt Pavements.
C.G.R.A. Guide to Structural Design of Flexible and Rigid Pavements in Canada.
D. A. Kasianchuk

Engineering 84.534, Transportation Planning

A study of administrative and economic fundamentals including objectives of transportation planning, history of transportation, comparative transportation and transportation statistics, administration and finance, transportation economics and taxation, transportation in the regional planning framework.
Lectures three hours a week, first term.
References: Pegrum, *Transportation Economics and Public Policy*.
Currie, *Economics of Canadian Transportation*.
Kaplan, *The Regional City*.
C. D. Holmes

Engineering 84.535, Highway Traffic

Theory of traffic flow; volumes, speeds, interpretation of field data; characteristics of vehicles and road users; mathematical models and assignment techniques, freeway, arterial intersection and interchange design as related to operational performance; traffic control devices; design and operation of signal systems; parking studies; computer and operations research techniques.
Lectures three hours a week, first term.
References: Kennedy, et al., *Fundamentals of Traffic Engineering.*
Matson, *et al., Traffic Engineering.*
Highway Capacity Manual; Traffic Engineering Handbook.
Lecturer to be announced

Engineering 84.536, Highway Materials

Physical characteristics and strength evaluation of soils and aggregates in relation to highway engineering; frost action in soils; sources, manufacture and composition of bituminous materials; evaluation of properties and characteristics of bituminous materials; soils stabilization and granulometrics. Lectures will be supplemented by laboratory work.
Lectures three hours a week, first term.
References: Abraham, *Asphalts and Allied Substances.*
Traxler, *Asphalt—Its Composition, Properties and Uses.*
Road Research Laboratory, *Bituminous Materials in Road Construction.*
D. A. Kasianchuk

Engineering 84.537, Urban Transportation

Urban transportation studies and the techniques used in collecting, analyzing and summarizing the facts of the transportation problem. Topics to be discussed include: urban planning and land-use studies, origin-destination studies, trip characteristics, generation and distribution, traffic assignment, parking, mass transit, system planning and evaluation.
Lectures three hours a week, second term.
References: Martin, et al., *Principles and Techniques of Predicting Future Demand for Urban Area Transportation.*
Public Administration Service, *Development of Urban Transportation Plans.*
C. D. Holmes

Engineering 84.538, Geometric Design

A study of the geometric design standards for streets and highways. Highway classifications and capacity, design of roadway elements, geometric features of at-grade intersections, interchanges, and freeway ends are considered.
Lectures three hours a week, second term.
References: Glass, *Fundamentals of Geometric Design.*
Jones, *The Geometric Design of Modern Highways.*
CGRA Manual of Geometric Design Standards for Canadian Roads and Streets.
Lecturer to be announced

Engineering 86.550, Electrical Materials

Equilibrium distribution of carriers in a uniform semiconductor. Diffusion trapping and recombination of injected carriers, photo-diodes. Non-uniform semiconductor — PN junction. Avalanche, Zener, tunnel and backward diode.
Lectures three hours a week, first term.
Text: Leck, *Theory of Semiconductor Junction Devices.*
Reference: Van der Ziel, *Solid State Physical Electronics.*
M. A. Copeland

Engineering 86.570, Structure of Materials

The theory of diffraction of x-rays, electrons and neutrons by single crystals, poly-crystals and liquids is developed. Methods of determining lattice parameters, crystal structures and crystal perfection are discussed.
Lectures three hours a week, first term.
References: James, *Optical Principles of X-Ray Diffraction.*
Gunier, *X-Ray Diffraction.*
J. A. Goldak

Engineering 86.571, Properties of Materials

Cartesian Tensors, transformations, the representation quadratic, the effect of crystal symmetry, and the Mohr circle instruction; equilibrium properties including para-magnetic and diamagnetic susceptibility, electric polarization, the stress, strain, thermal strain, piezoelectricity and elasticity tensors; thermodynamics of equilibrium properties; transport properties—thermal and electrical conductivity; crystal optics including optical activity and birefringence.
Lectures three hours a week, second term.
Text: Nye, *Physical Properties of Crystals.*
J. A. Goldak

Engineering 86.572, Deformation of Materials

Slip, twinning, kink bands and strain hardening in single crystals; yield point phenomena, strain ageing, strengthening mechanisms. Bauschinger effect and preferred orientation in polycrystalline aggregates; theories of fracture-delayed yielding, ductile fracture, notch effect, fracture curve, ductile-brittle transition, effect of hydrostatic pressure; theories of fatigue—size effect, surface effects, temperature dependence.
Lectures three hours a week, first term.
Text: Dieter, *Mechanical Metallurgy.*
M. J. Bibby

Engineering 86.573, Thermodynamics of Materials

Review of the three laws of thermodynamics, transformations of first and second order, effect of pressure, standard free energy of reaction; ideal and nonideal solu-tions, quasichemical treatment of solutions including order-disorder phenomena; equi-librium between phases of variable composition; free energy of binary systems and relationship to phase diagrams; thermodynamics of interfaces, surface energies of metals and compounds, internal boundaries; defects in crystals, point defects in metals, semiconductors and ionic compounds.
Lectures three hours a week, second term.
Text: Swalin, *Thermodynamics of Solids.*
M. J. Bibby

Engineering 88.510, Principles of V-STOL Aircraft

Review of flight performance analysis. Special requirements for V-STOL aircraft. High lift devices and boundary layer control; ground effect. Propellers, fans, ducted fans. Flight dynamics and control.
Lectures three hours a week, second term.
Reference: McCormick, *Aerodynamics of V-STOL Flight*.
J. C. Vrana

Engineering 88.512, Dynamics of Flight

Development of the general equations of motion of the airplane and its control systems. Small disturbance theory. Representation of aerodynamic effects by means of stability derivatives. Longitudinal and lateral stability criteria. Longitudinal and lateral modes of airplane motion. Transient motions of the airplane in response to control movement. Automatic stability and control. Response to atmospheric turbulence.
Lectures three hours a week, second term.
Prerequisite: Engineering 88.437 or the equivalent.
References: Etkin, *Dynamics of Flight*.
Kolk, *Modern Flight Dynamics*.
D. G. Gould

Engineering 88.513, Structural Dynamics and Aeroelasticity

Review of string and beam vibrations. Vibrations of membranes and plates. Theory of normal modes and solution by normal mode expansions. Fourier transform methods. Matrix methods and finite element techniques. Vibration of built-up bodies, multi-bay panels, complete aircraft. Introduction to flutter, wing divergence, classical wing flutter, panel flutter.
Lectures three hours a week, first term.
References: Hurty and Rubenstein, Dynamics of Structures.
Biggs, *Structural Dynamics*.
Fung, *Theory of Aeroelasticity*.
M. D. Olson

Engineering 88.547, Environmental Engineering

Thermal and humidity load analysis. Human comfort and tolerance. Environmental control methods: heating, refrigeration, humidification and drying; atmosphere and pollution control. System component characteristics; system analysis and design. Automatic controls.
Lectures three hours a week, first term.
Prerequisite: Engineering 90.546, or concurrent enrolment.
Text: Threlkeld, *Thermal Environmental Engineering*.
Lecturer to be announced

Engineering 89.501, Theory of Viscous Flow

Fundamental concepts of viscous flow; derivation of Navier-Stokes equations; Prandtl's boundary layer approximation; momentum integral methods; incompressible and compressible laminar and turbulent boundary layers; stability; transition; turbulent flow; flow separation; transformation methods; shock wave-boundary layer interaction; semi-empirical solution of turbulent skin friction and heat-transfer problems.
Lectures three hours a week, first term.
Prerequisite: Engineering 89.500 or equivalent.
Reference: Schlichting, *Boundary Layer Theory*.
R. J. Kind

Engineering 89.502, Hypersonic Flow

One dimensional unsteady compressible flow. Hypersonic similarity; hypersonic small disturbance theory and applications; Newtonian flow; tangent-wedge and tangent-cone approximations; viscous interaction; real gas effects; vibrational relaxation; ideal dissociating gas including relaxation; experimental simulation of hypersonic flows.
Lectures three hours a week, second term.
Prerequisite: Engineering 89.500 or equivalent.
References: Hayes and Probstein, *Hypersonic Flow Theory*.
Chernyi, *Introduction to Hypersonic Flow*.
R. F. Meyer

Engineering 89.503, Incompressible Nonviscous Flow

Derivation of the fundamental equations for inviscid incompressible and compressible flow; solution of two-dimensional potential flows by complex variable methods; axi-symmetric potential flows; vortex motion; low-speed airfoil theory; wing lifting-line theory.
Lectures three hours a week, first term.
References: Milne and Thompson, *Theoretical Hydrodynamics*.
Sommerfeld, *Mechanics of Deformable Bodies*.
Glauert, *Elements of Airfoil and Airscrew Theory*.
R. J. Kind

Engineering 89.504, Compressible Nonviscous Flow

Review of elementary compressible flow theory; isentropic, diabatic and frictional flow; normal and oblique shocks; expansion fans. Design of nozzle, diffuser and cascade contours; method of characteristics. Airfoils in compressible flow; Prandtl-Glauert rules; supersonic small perturbation methods. Unsteady one-dimensional flows; x-t diagrams; shock tubes; guns and gun tunnels.
Lectures three hours a week, second term.
References: Shapiro, *Dynamics and Thermodynamics of Compressible Fluid Flow*.
Owczarek, *Fundamentals of Gas Dynamics*.
Liepman and Roshko, *Elements of Gas Dynamics*.
R. J. Kind

Engineering 89.505, Wing Theory

Application of the basic equations of steady and unsteady, inviscid, incompressible and compressible flow to problems of wings of finite span. Solutions of three-dimensional potential flow by the method of singularities. Wings at subsonic speeds: Modified lifting-line and lifting surface theories with applications to rectangular and swept-back wings. (Weissinger, Multhopp, Gates and Falkner's methods.) Acceleration potential method. Low aspect ratio theories with applications to delta and rectangular wings. Wings at supersonic speeds: source distribution method, conical flow methods, characteristic coordinates. Applications to non-lifting and lifting wings of various plan forms. Wings at transonic speeds and selected topics from unsteady wing theory.
Lectures three hours a week, both terms.
Prerequisites: Engineering 89.503 and 89.504 or equivalent for engineers. Mathematics 69.446 for other students.
References: Robinson and Laurmann, *Wing Theory*.
Donovan and Lawrence, *Aerodynamic Components of Aircraft at High Speeds.*
P. Mandl

Engineering 89.508, Experimental Methods in Fluid Dynamics

Principles of flow measurement and visualization. Optics and optical systems. Pressure, temperature and velocity measurement in high speed flows, and in boundary layers. Flow visualization methods, three dimensional and skewed boundary layers. Skin friction and heat transfer. Data recording, logging and analysis. Test facilities.
Lectures three hours a week, first term.
References: Landenburg, *Physical Measurements in Gas Dynamics and Combustion,* Vol. 9 Princeton.
Donovan, *Problems of High Speed Aircraft and Experimental Methods,* Vol. 8 Series.
Not offered, 1968-69.

Engineering 89.509, Advanced Topics in Fluid Dynamics

Recent and advanced topics in fluid dynamics selected from recent publications. Students registered in the course are expected to present one or more lectures or seminars on assigned topics.
Lectures and seminars three hours a week, one term.
Prerequisite: Engineering 89.503 and 89.504 or equivalent.
Lecturer to be announced

Engineering 89.537, Groundwater and Seepage

Types and physical properties of aquifers, Darcy's law; hydraulic conductivity of isotropic, anisotropic, and multi-layered soils; uniform flow, unidirectional flow, steady and unsteady; Boltzman's transformation; radial flow, steady and unsteady; flow nets for various boundary conditions; method of images; partially penetrating wells; leaky aquifers; sea water intrusion, Ghyben-Herzberg relation between fresh and saline water, shape of interface; hydromechanics of unsaturated fluids in porous media.
Lectures three hours a week, first term.
References: Harr, *Groundwater and Seepage*.
DeWiest, *Geohydrology*.
Scheidegger, *The Physics of Flow Through Porous Media*.
Todd, *Ground-Water Hydrology*.
Lecturer to be announced

Engineering 89.541, Turbomachinery

Non-dimensional parameters and similarity. Energy and torque relations for rotating coordinate systems. Radial equilibrium equations. Cascades: flow; performance and testing. Axial flow turbomachines: energy relations, flow patterns, types, characteristics and design. Radial flow turbomachines: energy relations, flow patterns, types, characteristics and design. Viscous flow and boundary layer effects, skewed boundary layers and cross flows, secondary flows. Compressor surge and rotating stall.
Lectures three hours a week, second term.
References: Shepherd, *Principles of Turbomachinery*.
NASA SP 36, *Aerodynamic Design of Axial Flow Compressors*.
Horlock, *Axial Flow Compressors*.
Horlock, *Axial Flow Turbines*.
D. A. J. Millar

Engineering 90.542, Gas Turbines

Design-point cycle calculation. Analysis of fundamental components—compressors, combustors, turbines, nozzles, mixers, afterburners, heat exchangers, etc. Cycle characteristics of turbojet, turbofan, turboprop, turboshaft, etc., engines. Off-design performance calculation performance parameters; Reynolds number effects; component maps; theorems of equilibrium operation. Differential analysis techniques. Control concepts. Calculation and simulation of transient response.
Lectures three hours a week, first term.
References: Hodge, *Gas Turbines, Cycles and Performance Estimation*.
Zucrow, *Gas Turbines and Jet Propulsion Engines, Aircraft and Missile Propulsion*, Volume 2.
Sawyer, *Gas Turbine Engineering Handbook*.
E. P. Cockshutt

Engineering 90.543, Classical Thermodynamics

The first and second laws of thermodynamics. Criteria of equilibrium; temperature, entropy and availability. Property relations of pure substances and mixtures; phase rule and thermodynamic potentials. Thermodynamics of irreversible processes; Onsager relations.
Lectures three hours a week, first term.
Text: Hatsopoulos and Keenan, *Principles of General Thermodynamics*.
E. G. Plett

Engineering 90.544, Statistical Thermodynamics

Microscopic structure of substances. Kinetic theory. Maxwell, Bose-Einstein & Fermi-Dirac Statistics. Entropy, probability, equilibrium.
Lectures three hours a week, second term.
References: Lee, Sears and Turcotte, *Statistical Thermodynamics*.
Sonntag and Van Wylen, *Fundamentals of Statistical Thermodynamics*.
F. W. Black

Engineering 90.547, Conduction Heat Transfer

Conduction heat transfer in steady and transient state, including heat sources. Analytical, numerical, graphical and analog methods of solution for steady and fluctuating boundary conditions. Thermal stresses.
Lectures three hours a week, first term.
Reference: Schneider, *Conduction Heat Transfer*.
R. C. Biggs

Engineering 90.548, Convection Heat Transfer

Study of the nature of heat, mass and momentum transfer in fluids. Free and forced convection for laminar and turbulent flows in ducts and over flat plates and blunt bodies. Heat transfer coefficients at high velocities and in rarefied gases. Heat transfer-friction relationship in heat exchangers. Condensation and boiling heat transfer. Combined heat and mass transfer.
Lectures three hours a week, second term.
Reference: Rohsenow and Choi, *Heat, Mass and Momentum Transfer*.
E. G. Plett

Engineering 90.549, Radiation Heat Transfer

Introduction to electromagnetic radiation theory; physics of continuous and live spectral emission, absorption, reflection and transmission; source and nature of radiation from solids, gases and plasmas. Geometrics of radiation; shape factors and radiation exchange between black, gray and non-gray bodies. Radiation shielding; thermal control by selective absorption and re-emission. Application of radiation heat transfer analysis in building design; in space vehicle design.
Lectures three hours a week, first term.
References: Sparrow and Cess, *Radiation Heat Transfer*.
Kreith, *Radiation Heat Transfer*.
R. C. Biggs

Engineering 93.556, Active Network Theory

Properties of the linear active quadripole; Happ's Tables, deviations; driving point immittances; transfer properties, voltage, current and power gain, stability factors. Mason's U function, network invariants. Power gain as a function of stability factor and reverse transfer admittance, Linvill charts. Active element pairs. Oscillator configurations.
Lectures three hours a week, first term.
Text: Cote and Oakes, *Linear Vacuum-Tube and Transistor Circuits*.
Reference: de Pian, *Linear Active Network Theory*.
M. A. Gullen

Engineering 93.586, Active Network Design

Amplifier cascades, passive coupling networks, the interstage filter, Butterworth and Tchebyshev responses; band-pass to low-pass transformations; synchronous and staggered single-tuned cascades, double-tuned cascades. Wide-band amplifiers, shunt and series peaking. Additive amplification, distributed and split-band amplifiers. Amplifier transient response, overshoot. Feedback amplifiers. Nyquist and Bode plots, gain and phase margins. Oscillator design, limiting conditions, frequency stability, efficiency. Class D systems. Noise theory, minimal noise circuits.
Lectures three hours a week, second term.
Prerequisite: Engineering 93.556.
Text: Searle, Thornton, et al., *Multistage Transistor Circuits*.
Reference: Searle, Boothroyd, et al., *Elementary Circuit Properties of Transistors*.
D. F. Page

Engineering 94.545, Nonlinear Systems Analysis

Definitions and examples of nonlinearities; nonlinear mechanical and electrical systems. Phase plane representation: energy curves, phase trajectories, relay servo-mechanisms, optimum switching servos, hysteresis, deadband, delay time. Analytical solutions to nonlinear problems. Describing functions; frequency response; root locus limitations; stability criteria. An introduction to nonlinear systems with random inputs.

Lectures three hours a week, second term.

References: Graham and McRuer, *Analysis of Nonlinear Control Systems.*
Ku, *Analysis and Control of Nonlinear Systems.*
J. S. Riordon

Engineering 94.552, Advanced Linear Systems

Mathematical techniques used in the analysis of linear systems. Review of analysis by transform methods using the Fourier Transform and the convolution integral. Z-transforms. General relationship between time functions and frequency functions. Band-pass/low-pass transformations and the Hilbert Transform. The Sampling Theorem and general orthonormal expansions. State-space methods. Properties of finite, linear, lumped and bilateral parameter systems.

Lectures three hours a week, first term.

References: Papaulis, *The Fourier Integral and its Applications.*
Brown, *Analysis of Linear Time-Invariant Systems.*
Schwarz and Friedland, *Linear Systems.*
B. Pagurek

Engineering 94.553, Random Processes

An introduction to the description of random signals. Time averages; time-auto-correlation functions, spectral functions and their properties; introduction to system optimization. Sampling and recovery of signals. Probability theory; probability functions, joint and conditional probabilities, random variables, statistical averages, characteristic functions, sampling, law of large numbers, central limit theorem. Statistical description of time series.

Lectures three hours a week, first term.

References: Lee, *Statistical Theory of Communication.*
Parzen, *Modern Probability Theory and Its Applications.*
D. A. George

Engineering 94.554, Statistical Communication Theory and Information Theory

Description of random processes. Special calculations. Optimum linear systems: realizable and unrealizable Wiener filters, the matched filter. Noise sources; circuit noise calculations; noise figure. Statistical decision theory: hypothesis testing, parameter estimation. Information theory: basic concepts, the discrete channel, the continuous channel. Introduction to coding. Modulation systems. System comparisons.

Prerequisite: Engineering 94.553.

Lectures three hours a week, second term.

References: Harman, *Principles of the Statistical Theory of Communication.*
Davenport and Root, *An Introduction to Random Signals and Noise.*
Schwartz, Bennett and Stein, *Communication and Techniques.*
Abramson, *Information Theory and Coding.*
D. C. Coll

Engineering 94.555, Advanced Linear Control Theory

Review of the basic theory and methods of linear feedback control. Flow graphs. The root-locus method and application to compensation design. Linear control systems with random inputs and optimization. Linear sampled data systems.
Lectures three hours a week, first term.
Text: Truxal, *Control System Synthesis.*
J. S. Riordon

Engineering 94.565, Digital Communications Systems

Analogue sources, A/D conversion. Digital sources, source coding. Message sets and radar signals with specified properties. Modems: AM, FSK, PSK, Kineplex, Duo-binary. Digital channel models: BSC, BEC, impulse noise, burst noise. Time varying, multipath channels, intersymbol interference, equalization, Binary detection, Bernoulli decision strategies. Error control: error detecting and correcting codes, algebraic codes, capabilities of codes, sequential coding.
Lectures three hours a week, first term.
References: Golomb, et al., *Digital Communications, with Space Applications.*
Peterson, *Error Correcting Codes.*
Bennett and Davey, *Data Transmission.*
IEEE Transactions on Information Theory and Communication Technology.
B. A. Bowen

Engineering 94.566, Advanced Topics in Control Systems

A course dealing with recent and advanced topics in the field of control systems and related areas. Primary references are recent publications in the field. Students registered in the course are expected to present one or more lectures or seminars on assigned topics.
Prerequisite: Engineering 94.585.
Lectures and seminars three hours a week, one term.
B. Pagurek and J. S. Riordon

Engineering 94.584, Advanced Topics in Communication Systems

A course dealing with recent and advanced topics in the field of communication systems and related areas. Primary references are recent publications in the field. Students registered in the course are expected to present one or more lectures or seminars on assigned topics.
Lectures and seminars three hours a week, one term.
Prerequisite: Engineering 94.565.
D. C. Coll and D. A. George

Engineering 94.585, Time-Varying, Adaptive and Optimal Control Systems

State-space methods applied to time-invariant and time-varying systems. The calculus of variations. The Maximum Principle of Pontryagin. Non-linear systems, on-off systems. Dynamic programming. Iterative optimization techniques. Introduction to adaptive control systems.
Lectures three hours a week, second term.
References: Eveleigh, *Adaptive Control and Optimization Techniques.*
Athans and Falb, *Optimal Control.*
De Russo, Roy and Close, *State Variables for Engineers.*
B. Pagurek

Engineering 95.557, Topics in Switching Theory

Pulse-mode operation and clocked sequential circuits. State diagrams, regular expressions, transition matrices. Linear sequential circuits, autonomous machines, maximal-period sequence generators, translates. The coding of internal states, minimization of combinational logic. Hazard detection in combinational and sequential circuits, ternary algebra. Synthesis of combinational logic with NAND, NOR gates. Redundancy techniques.

Lectures three hours a week, second term.

References: Miller, *Switching Theory*, Volumes I and II.

Kautz, *Linear Sequential Switching Circuits*.

Moore, *Sequential Machines; Selected Papers*.

M. A. Gullen

Engineering 95.560, Advanced Engineering Application of Digital Computers

The study, in depth, of topics in advanced numerical and computational methods for the solution of engineering problems. Topics covered will vary, depending on the instructor, but will include such topics as: partial differential equations of the elliptic, parabolic and hyperbolic type, with special emphasis on stability and error propagation; minimization and optimization techniques for linear and non-linear functions; curve-fitting, orthogonal functions, Fourier synthesis, regression, smoothing; Monte Carlo methods.

Lectures three hours a week, first term.

References: Scarborough, *Numerical Mathematical Analysis*.

Fox, *Numerical Solution of Ordinary and Partial Differential Equations*.

Phillips and Rabinovit, *Numerical Solution of Integral Equations*.

Hamming, *Numerical Methods of Scientists and Engineers*.

Hemmerle, *Statistical Computations on a Digital Computer*.

Faddeeva, *Linear Equations*.

J. P. Knight

Engineering 96.558, Topics in Semiconductor Devices

Limitations on performance of conventional transistors due to: noise, device geometry, temperature, high-current and high-voltage operation. Field effect transistors: diffused-gate and insulated-gate; influence of structure on electrical performance. Integrated circuits; some aspects of design and characterization. Special purpose diodes; varactor, snap-off, avalanche-transit-time oscillator, hot electron. Schottky barrier, and tunnel diode; construction and behaviour. The Gunn-effect device.

Prerequisite: Engineering 96.580 or equivalent.

Lectures three hours a week, second term.

Text: Thornton, et al., *Characteristics and Limitations of Transistors*, SEEC Vol. 4.

Reference: Warner and Fordemwalt, *Integrated Circuits Design Principles and Fabrication*.

A. R. Boothroyd

Engineering 96.580, Theory of Semiconductor Devices

A study, in depth, of the physical basis for the behaviour of semiconductor devices. Derivation of valid electrical models from consideration of the geometry, materials, and construction of existing devices. The modelling and design of new devices to meet specified requirements.
Lectures three hours a week, first term.
References: SEEC Publications, Volumes 1, 2 and 3.
Nussbaum, *Electromagnetic and Quantum Properties of Materials*.
A. R. Boothroyd

Engineering 96.588, Theory of Solid State Magnetic and Dielectric Devices

A treatment of the theory and application of solid state devices of major importance, exclusive of the transistor; for example, digital memory devices, magnetic and dielectric transducers, microphones and MOS capacitors. The aim of the course is to develop the ability to model, analyze and develop devices through the study of the underlying physical principles and the use of appropriate techniques of linear and non-linear analysis. The ability to develop electrical equivalent circuits is emphasized.
Lectures three hours a week, second term.
References: Cunningham, *An Introduction to Non-Linear Analysis*.
Katz, *Solid State Magnetic and Dielectric Devices*.
Nussbaum, *Electromagnetic and Quantum Properties of Materials*.
M. A. Copeland

Engineering 97.515, Introduction to Plasma Dynamics

Basic theory of plasmas in tensor and indicial notation. Orbit theory, collision processes and cross-sections, introductory kinetic theory, continuity and momentum equations, diffusion and conductivity, Debye shielding, plasma resonances and introduction to waves in plasmas.
Lectures three hours a week, first term.
References: Stix, *The Theory of Plasma Waves*.
Holt and Haskell, *Foundations of Plasma Dynamics*.
G. D. Cormack

Engineering 97.516, Magnetoplasmadynamics

Heat and current flow in collision-dominated moving plasmas. Application of theory to analysis of MPD generators, plasma accelerators, MPD waves, high velocity shock waves, MPD shock waves, and sheathes. Production of plasmas, diagnostics of plasmas, current research.
Lectures three hours a week, second term.
References: Rose and Clarke, *Plasmas and Controlled Fusion*.
Holt and Haskell, *Foundations of Plasma Dynamics*.
G. D. Cormack

Engineering 97.551, Applied Electromagnetic Theory

Electromagnetic phenomena in materials and in free space. The course starts from Maxwell's equations and treats potentials, the Hertz vector, energy, generalized waves, interfaces, bulk properties, waveguide circuits, antenna arrays, aperture antennas, antenna patterns, wave polarization, wave coherence, and effects due to anisotropic media and complex constitutive parameters.
Lectures three hours a week, first term.
Text: S. Ramo, John P. Whinnery and Theodore Van Duzer, *Fields and Waves in Communication Electronics*.
References: Jones, *The Theory of Electromagnetism*.
Atwater, *Introduction to Microwave Theory*.
W. Makios

Engineering 97.581, Topics in Electromagnetic Theory

Perturbational and variational techniques applied to waveguides and cavities. Wave guide network analysis, equivalent circuits of obstacles and irises in waveguides, propagation characteristics of ferrites and of waveguides containing inhomogenous dielectrics. Electromagnetic wave interactions with inhomogeneous, anisotropic media. Sommerfeld's solution to propagation over a flat earth using the plane-wave spectrum concept.
Lectures three hours a week, second term.
References: Collins, *Field Theory of Guided Waves*.
Budden, *Introduction to Wave-Guide Mode Theory of Wave Propagation*.
Jones, *The Theory of Electromagnetism*.
W. Makios

Engineering 99.596, Directed Studies

Engineering 99.599, M.Eng. Thesis

Engineering 99.699, Ph.D. Thesis

English Language and Literature

Professor; Chairman of the Department	Munro Beattie
Professors	G. B. Johnston, R. L. McDougall
Visiting Professor	A. W. Trueman
Associate Professors	V. K. Chari, T. H. Coulson, Charles Haines, B. W. Jones, Marston LaFrance, James Steele (on leave of absence second term, 1968-69), A. T. Tolley, G. J. Wood
Assistant Professors	M. I. Cameron, James Downey, W. Patrick Dunn, Barbara Garner, Maureen Hanna (on leave of absence, 1968-69), John J. Healy, T. J. Henighan, Robert Laird, R. H. MacDonald, Robin D. Mathews, Alan D. McLay, Thomas J. Middlebro', Kathleen O'Donnell (St. Patrick's College), Ian Pringle, R. I. Stephens-Jones, Alistair Tilson, James Wilcox, Douglas Wurtele, Lorna D. Young (on leave of absence, 1968-69)
Lecturers	D. A. Beecher, Robert L. Hogg
Sessional Lecturers	Norman A. Anderson, Thomas Farley, Michael Gnarowski, Sean Haldane, Pauline Hemming, Donald McGregor, Sonia Tilson, Anna Wurtele
Teaching Fellows	Alexandra Carr, Margaret Yeo; others to be announced

Major in English

Every student who elects English as a major subject will plan his program in consultation with a member of the department. The major in English consists of a minimum of six courses in English, as follows:

a) a first year course in English, preferably English 18.162;
b) English 18.232 or 18.242 in the second year, and 18.352 in the third year;
c) three other courses in English.

With the approval of the department, a student may arrange in special cases a course program which would allow alternatives to 18.232 or 18.242 and to 18.352.

In order to continue in the major or honours program, a student must attain an average of 60% or better in the first year course in English. An average of at least 60% must be maintained thereafter in English courses.

A combined major in English and another subject will include at least five courses in English. 18.232 or 18.242 and 18.352 (or in special cases approved alternatives) are required. Both departments must be consulted in planning a combined program.

Honours in English

All students who meet the general university honours requirements, and who have at least second class standing in English, will be admitted to, and permitted to continue in the Honours program. Students with third class standing in English will be given individual consideration on application to the departmental honours advisory committee.

An honours student will plan his program in consultation with a member of the department's honours advisory committee. Honours students should become familiar with the General Regulations for Honours Degrees (p. 47). The honours program consists of eleven courses in English, to include the following:

a) a first year course in English, preferably 18.162;
b) 18.205 or 18.212, and 18.232 or 18.242 in the second year;
c) 18.300 and 18.352, in the third year, and 18.436 in the third or fourth year;
d) 18.499 in the final year.

The remaining courses in English are to be chosen in consultation with a member of the honours advisory committee.

The department recommends that English 13.309 (also listed as Classical Civilization 13.309) be taken in the second year. This will be counted as one of the eleven courses required for the honours degree. Students wishing to take English 13.309 in the first year may, with Departmental approval, defer a subject in the First year Arts program (p. 49).

With the approval of the honours advisory committee, a student may arrange in special cases a course program which allows alternatives to 18.232 and 18.352.

Courses in Comparative Literature approved by the advisory committee may be counted towards the honours degree in English.

In deciding the class of honours degree, the department will give special weight to English courses taken in the final year.

Combined honours programs may be taken with French, German, History, Philosophy, Sociology, and with other departments by arrangement. Eight courses in English are usually required, including 1) 18.205, 18.212 or 18.322; 2) 18.232 or 18.242 (or approved alternatives); 3) 18.352 (or approved alternatives); 4) 18.436; 5) 18.499.

For information regarding preparation for admission to the Ontario College of Education for the Interim High School Assistant's Certificate, Type A, students are invited to consult the Registrar. Students who look forward to high-school teaching as a career are urged to consider the advisability of taking an honours degree.

Graduate Studies

The Department of English offers programs of studies leading to the degree of Master of Arts in English Language and Literature. Such programs are planned with regard both to each candidate's special requirements and to the library facilities available. (See also p. 88).

An applicant for admission to graduate study in English must have completed the requirements of an Honours B.A. degree in English Language and Literature, or have similar qualifications, to qualify for a one-year M.A. program. Specifically, this requirement means that an applicant must have completed five courses beyond the Pass B.A. degree and attained at least Second Class standing in examinations as an undergraduate, at the honours level, in at least *five* of the following areas of English Language and Literature:

History of the English Language *or* General English Linguistics
Old English *or* Middle English
Renaissance Literature
Drama, including Shakespeare
Restoration and Eighteenth-Century Literature
Romantic and Nineteenth-Century Literature
Twentieth-Century Literature
Canadian *or* American Literature

Applicants whose Honours B.A. degree does not include examination in Old English, *or* Middle English, *or* History of the English Language must either take the honours course in *one* of these subjects or write the honours examination in it, obtaining Second Class standing, in addition to completing the required graduate courses.

Applicants who hold a General or Pass B.A. degree of Second Class standing or higher, with a major in English Language and Literature, may be admitted. They will be required to complete a qualifying year program (normally four or five courses in English as determined by the Department of English), and maintain at least Second Class standing in each of their qualifying courses, before proceeding to the M.A. program.

Applicants must have a reading knowledge of one foreign language acceptable to the Department of English (e.g., French, German, Latin, Greek — although, given special circumstances, other languages may be acceptable).

A candidate for the M.A. degree in English Language and Literature must obtain at least Second Class standing in each of three graduate courses, submit an acceptable thesis, and pass a final oral examination based upon his completed thesis and course work.

For further details, consult M. LaFrance, departmental supervisor of graduate students.

English 18.010, Literature and Composition

The course is based on the study of selected plays, poems, short stories, essays, and novels. Essay-writing is required.
Day Division: Annually (three hours a week).
D. A. Beecher (co-ordinator), Ian Cameron, Pauline Hemming, R. I. Stephen-Jones
Evening Division: Annually (three hours a week).
Mary L. Wilson
Summer: 1968 *Evening Division* (lectures five hours a week).
D. M. McGregor

English 18.100, English Authors from Chaucer to T. S. Eliot

A study of significant works of English literature, presented as a general historical survey from the fourteenth to the twentieth century. Essay-writing will be required. The course will include works by Chaucer, Shakespeare, Milton, Swift, Austen, Hawthorne, Dickens, Twain, Shaw, Eliot, Orwell.
Prerequisite: English 18.010 or equivalent.
Day Division: Annually (three hours a week).
Douglas Wurtele (co-ordinator), Barbara Garner, R. Laird, R. Mathews, A. McLay, J. Steele, Sonia Tilson
Evening Division: 1968-69 (three hours a week).
T. Farley, Anna Wurtele
Summer: 1968 *Evening Division* (lectures five hours a week).
Barbara Garner and Sonia Tilson

English 18.101, English and Continental Texts: Dante to T. S. Eliot

A study of selected texts of English, American and Continental literature, including Dante, Chaucer, Boccaccio, Shakespeare, Defoe, Byron, Flaubert, Tolstoi, Waugh, Beckett. Continental texts will be read in translation. Essay-writing and regular participation in discussion groups are required.
Prerequisite: English 18.010 or equivalent.
Day Division: Annually (lectures two hours a week, group discussion one hour a week).
C. Haines and assistants

English 18.102, Form and Tradition

A study of the dominant literary forms of the present day: the novel, short story, essay, poetry, and the drama. The course attempts to develop both an awareness of form and a perspective of values by comparing significant modern works with traditional works in each genre. Authors studied include Shakespeare, Wycherley, O'Casey, Defoe, Samuel Butler, Lawrence, Joyce, Mary Shelley, Huxley and others. Essaywriting will be required and special attention will be given to a topic of contemporary significance.
Prerequisite: English 18.010 or equivalent.
Day Division: Annually (three hours a week).
W. P. Dunn (co-ordinator), D. A. Beecher, S. Haldane, John Healy, R. L. Hogg, R. L. McDougall.
Evening Division: Annually (three hours a week).
V. K. Chari
Summer: 1968 *Evening Division* (lectures five hours a week).
D. A. Beecher

English 18.115

A study of selected examples of literary genres from classical antiquity to the twentieth century. Open to students reading for an Engineering degree. This course may serve, at the discretion of the English Department, as a prerequisite to advanced courses in English.
Day Division: Annually (lectures two hours a week, discussion group one hour a week).
M. LaFrance (co-ordinator), T. J. Middlebro', J. M. Wilcox

English 18.162, Twentieth-Century Literature

For major and honours students only, in the first year. An introduction to literary study, examining the poetry, fiction, drama and literary criticism of the twentieth century. The relation between critical ideas and literary works will be emphasized. The course will consider the following: short fiction, the work of Conrad and Lawrence, a group of critical essays, and a selection of poems.
Day Division: Annually (four hours a week, including a one-hour seminar).
T. J. Henighan (co-ordinator), R. L. Hogg, R. H. MacDonald, A. T. Tolley
Evening Division: 1968-69 (four hours a week).
Lecturer to be announced

English 18.205, History of the Language

A course on the nature and development of the sounds, grammar and spelling of the English language, together with some study of its cultural and stylistic evolution. The course may serve as an alternative to English 18.212 (Old English) for honours students.
Prerequisite: a first-year course in English.
Day Division: 1968-69 (three hours a week).
I. Pringle
Summer: 1968 *Evening Division* (five hours a week).
I. Pringle

English 18.212, Old English

A study of Old English language and literature, including grammar and phonology, and translation of selections of Old English prose and poetry.
Prerequisite: a first-year course in English.
Day Division: Annually (three hours a week).
G. B. Johnston

English 18.232, English Studies I

The required course for second year honours and major students. A selected group of major authors from Chaucer to Pope will be studied intensively, and their intellectual and artistic relationships emphasized: in 1968-69, Chaucer, Marlowe, Donne, Jonson, Milton, Swift and Pope.
Prerequisite: a first-year course in English.
Day Division: 1968-69 (three hours a week, lectures and seminar).
I. Cameron, R. I. Stephens-Jones
Evening Division: 1968-69 (three hours a week).
A. Tilson
Summer: 1968 *Day Division* (ten hours a week).
A. Tilson

English 18.234, Drama in England until 1642

Study of the development of dramatic production and literature from the middle ages to the closing of the theatres in 1642. Reading of representative plays, excluding Shakespeare.
Prerequisite: a first-year course in English.
Day Division: 1968-69 (lectures two hours a week).
A. W. Trueman

English 18.236, Shakespeare

Intensive study of Shakespeare's environment and development as a dramatist, with careful reading of certain plays.
Prerequisite: a first-year course in English.
Day Division: 1968-69 (lectures two hours a week).
C. Haines and A. W. Trueman
Summer: 1968 *Day Division* (ten hours a week).
N. A. Anderson

English 18.242, Restoration, Eighteenth-Century, and Romantic Literature

Survey, for major and honours students, of the period from Dryden to Keats.
Prerequisite: major or honours standing.
Day Division: Annually (three hours a week, lectures and seminar).
B. W. Jones (co-ordinator), J. Downey, J. Steele

English 18.298, Writing Seminar

A non-credit seminar in writing, involving regular assignments in various genres, and practical criticism based on this work. Time to be arranged.
Lecturer to be announced

English 18.300, Literary Criticism from Aristotle to the Present

Text: W. J. Bate, *Criticism*: *The Major Texts*.
Prerequisite: honours students, others by permission.
Day Division: Annually (three hours a week, lectures and seminar).
A. Tilson

English 18.303, The English Novel

The development of the art of fiction in English literature, from its beginning in the eighteenth century, through the major Victorian novelists, to the beginning of the twentieth century.
Prerequisite: a first-year course in English or permission.
Day and Evening Division: 1968-69 (lectures two hours a week).
T. Coulson
Summer: 1968 *Evening Division* (lectures five hours a week).
J. M. Wilcox

English 18.304, A Survey of Drama

The development of dramatic traditions and themes from the classical to the contemporary theatre, with particular emphasis on English and American drama.
Prerequisite: a first-year course in English.
Day Division: 1968-69 (lectures three hours a week).
G. J. Wood

English 13.309, Greek and Latin Literary Genres

A study through English translations of the various genres of Greek and Latin literature, especially those which influenced later European writing: epic, drama, the ode, pastoral poetry, satire. (Offered in the Department of Classics as *Classical Civilization 13.309*.)
Day Division: 1968-69 (two hours a week).
D. G. Beer

English 18.322, Middle English

A study of the English language and literature between the Norman Conquest and the fifteenth century. Special attention is given to fourteenth-century literature.
Prerequisite: for honours students, others by permission.
Evening Division: 1968-69 (three hours a week).
Maureen Hanna

English 18.327, Chaucer and the Allegorical Tradition

A study of the works of Chaucer and Spenser, principally *The Canterbury Tales* and *The Faerie Queene*, together with contemporary background and current critical writings.
Prerequisite: permission of the instructor.
Day Division: 1968-69 (three hours a week).
D. Wurtele

English 18.336, Milton

An intensive study of the poetry and prose of Milton, combined with an examination of the intellectual background of his work and his age.
Prerequisite: honours standing or permission of the instructor.
Day and Evening Division: 1968-69 (seminar two hours a week).
G. J. Wood

English 18.338, Studies in the Renaissance

An intensive study of selected Renaissance authors. In 1968-69 the development of English humanism will be examined.
Prerequisite: English 18.132 or permission.
Day Division: 1968-69 (two hours a week).
R. H. MacDonald

English 18.342, Eighteenth-Century Literature

Detailed study of authors and movements of the period 1660-1780, with special emphasis on Dryden, Swift, Pope and Johnson.
Prerequisite: English 18.242 or permission.
Not offered, 1968-69.

English 18.348, Studies in Romanticism

Detailed study of authors and themes in the period 1790 to 1830; in 1968-69 emphasis will be placed on the works of Blake and Keats.
Prerequisite: English 18.242 or permission.
Day Division: 1968-69 (seminar two hours a week).
B. W. Jones
Summer: 1968 *Day Division* (ten hours a week).
B. W. Jones

English 18.352, Victorian and Twentieth-Century Literature

Survey for major and honours students of the period from 1830 to the present.
Prerequisite: English 18.242 or permission.
Day Division: Annually (three hours a week, lectures and seminar).
T. Coulson (co-ordinator), R. Mathews, T. J. Middlebro'

English 18.357, Victorian Poetry

A detailed examination of the works of Tennyson, Browning, and Arnold, as well as an examination of important poems by Fitzgerald, Clough, Rossetti, Morris and Swinburne. The diversity of poetic theory and practice in the Victorian period will be emphasized.
Prerequisite: a first-year course in English.
Day Division: 1968-69 (seminar two hours a week).
R. Laird

English 18.358, Nineteenth-Century Thought

Readings in the Romantic and Victorian periods, emphasizing ideas on culture, society, and the uses of literature; Burke, Coleridge, Carlyle, Newman, Mill, Bagehot, Ruskin, Arnold, Huxley, Butler, Morris, and Shaw receive special attention.
Not offered, 1968-69.

English 18.361, Twentieth-Century Poetry

This course will trace the development of twentieth-century poetry written in English. Particular attention will be paid to the relation between the poetry and critical ideas of the poets discussed.
Prerequisite: a first-year course in English.
Day Division: 1968-69 (lectures three hours a week).
A. T. Tolley

English 18.362, Major Twentieth-Century Authors—Anglo-Irish Literature

The poetry, drama, and fiction of the Anglo-Irish Literary Resurgence (1880-1940), with special consideration of works by Lady Gregory, W. B. Yeats, J. M. Synge, Sean O'Casey, Oscar Wilde, Bernard Shaw, George Moore, and James Joyce.
Prerequisite: a first-year course in English.
Not offered, 1968-69.
Summer: 1968 *Day Division* (ten hours a week).
Lorna Young

English 18.363, Twentieth-Century Fiction

Detailed analytic study of twentieth-century fiction. The main emphasis is on British and American fiction, including the short story.
Prerequisite: a first-year course in English.
Evening Division: 1968-69 (lectures two hours a week).
James Wilcox

English 18.367, Contemporary Texts

Detailed analytic study of twentieth-century works of literature.
Prerequisite: permission of the instructor.
Not offered, 1968-69.

English 18.372, American Literature

A survey of American literature from colonial times to the present, concentrating on poetry and the novel.
Prerequisite: a first-year course in English.
Day Division: 1968-69 (lectures three hours a week).
V. K. Chari

English 18.382, Canadian Literature

A study of the origins and development of a national literature in Canada, and, specifically, of selected works of the following authors: Haliburton, Moodie, Sangster, Mair, Crawford, Lampman, Scott, Carman, Roberts, Duncan, Leacock, Grove, Callaghan, MacLennan, Pratt, Klein, Davies, Raddall, Wilson, Ross, Macpherson, Reaney, Birney, Layton.
Prerequisite: a first-year course in English or permission.
Day Division: 1968-69 (two hours a week).
Kathleen O'Donnell

English 18.387, Writing in Canada since 1920

A study of selected works of contemporary Canadian authors: MacLennan, Callaghan, Raddall, Davies, Pratt, Klein, and others.
Prerequisite: a first-year course in English or permission.
Not offered, 1968-69.

English 18.403, Seminar in the English Novel

A seminar for the study and discussion of the art of the novel as exemplified by major works of fiction. Study will include varieties of form and pattern, modes of narration, imagery and symbolism, realism and naturalism. The following authors will be examined in detail: Defoe, Austen, Bronte, Tolstoi, James, Faulkner, Forster, Huxley, Dos Passos. Some consideration will be given to the modern short story.
Prerequisite: Honours students, others by permission of the instructor.
Day and Evening Division: 1968-69 (seminar two hours a week).
A. M. Beattie

English 18.411, Old English Poetry

Translation and study of the text of Beowulf and the Finnsburg Fragment.
Prerequisite: permission of the instructor.
Day and Evening Division: 1968-69 (seminar two hours a week).
I. Pringle

English 18.418, Old Norse

An introductory study of the Old Norse language and literature.
Text: Gordon, rev. Taylor, *An Introduction to Old Norse.*
Prerequisite: English 18.212 or an equivalent course in Old English, or permission of the instructor.
Day and Evening Division: 1968-69 (three hours a week).
G. B. Johnston

English 18.436, Seminar in Shakespeare

A seminar for honours students, concentrating on critical and scholarly approaches to Shakespeare's work.
Prerequisite: honours standing.
Day Division: Annually (seminar two hours a week).
C. Haines

English 18.448, Studies in Neoclassicism

An intensive study of the origins and the thematic and rhetorical development of neoclassicism from Ben Jonson to Samuel Johnson.
Prerequisite: English 18.242 or permission.
Not offered, 1968-69.

English 18.477, Major American Authors

A detailed examination of the thought and work of a selected group of significant American writers. In 1968-69, the following poets will be studied: Longfellow, Whitman, Emily Dickinson, Frost, Hart Crane, Stevens.
Prerequisite: English 18.372 or permission.
Day Division: 1968-69 (three hours a week).
V. K. Chari

English 18.487, Selected Topics in Canadian Literature

An advanced course for majors and honours students in English. The general field of study for 1968-69 is to be contemporary Canadian poetry.
Prerequisite: English 18.382, or permission.
Day and Evening Divisions: 1968-69 (seminar two hours a week).
M. Gnarowski

English 18.488, Studies in the Literature of the Commonwealth

An examination, selective and comparative, of the relation between literature and environment in countries of the Commonwealth where English is used as a literary language.
Prerequisite: departmental permission.
Day Division: 1968-69 (seminar two hours a week).
John Healy

English 18.498, Independent Study

Occasionally a student may undertake a piece of individual research under the supervision of a member of the department. Consult the Chairman.

English 18.499

Essay-writing and tutorials, required of all honours students in their final year.

Comparative Literature

Honours English students should consider the following courses in Comparative Literature, offered in 1968-69 (see p. 70):
17.401 *Seminar on Literary Theory*
17.467 *Special Topics in Modern Fiction*
17.561 *The Development of the Medieval Courtly Epic*

Graduate Courses

Note: Summer reading lists should be obtained from the Department of English.

English 18.522, Middle English

A study of the English language and literature between the Norman Conquest and the fifteenth century. Special attention is given to fourteenth-century literature.
Evening Division: 1968-69 (three hours a week).
Maureen Hanna

English 18.538, Renaissance Studies

A detailed study of particular problems of Renaissance literature and thought. Critical and scholarly approaches to the study of the period will be emphasized.
Day Division: 1968-69 (seminar two hours a week).
Barbara Garner

English 18.548, The Literature of Authority

A course designed to explore some of the major political, religious, philosophical, and literary presuppositions in the literature of the Augustan period, with emphasis upon Dryden, Swift, and Pope.
Day Division: 1968-69 (seminar two hours a week).
J. Downey

English 18.551, Major Victorian Poets

The aim of this course is to allow the student to investigate in detail the poetry of Tennyson, Browning and Arnold, and to present his conclusions for discussion in a seminar. The course will concentrate on poetic techniques and the aesthetic philosophies which underlie them.
Day Division: 1968-69 (seminar two hours a week).
R. Laird

English 18.564, Modern Drama

An intensive survey of major dramatists and the themes and theatrical traditions they represent, from Ibsen and Strindberg to the present.
Day Division: 1968-69 (seminar two hours a week).
G. J. Wood

English 18.567, The Modern Novel

The course will concentrate on the outstanding developments in the art of fiction since 1900, with particular attention given to the psychological novel. Authors considered in detail will be Joyce, James, Dorothy Richardson, Virginia Woolf, and some work will be done with recent experiments by such writers as Beckett, Burroughs, and the French writers of the "anti-roman."
Day and Evening Division: 1968-69 (seminar two hours a week).
A. M. Beattie

English 18.578, Problems of Scholarship in American Fiction

Selected studies concerning the American novel and short story from Charles Brockden Brown to the present: for example, the Gothic mode, the role of the frontier, the associationist aesthetic, the rejection of tradition, naturalism and romantic decadence, the empirical basis of morality, the study of at least two novelists in depth as representatives of their period in American intellectual life.
Day Division: 1968-69 (seminar two hours a week).
M. LaFrance

English 18.587, The Literary Imagination in Canada

Studies in three dimensions of cultural history: "The Temper of the Times," a descriptive approach to thought and taste in four selected decades of Canadian life; "Myths, Concepts and Ideologies," an examination of the preferred images which nourish the characteristic dialogue of a developing Canadian culture; and "Verbal Universe," an appreciation of the unique concerns and achievements of some of the more important writers in Canada. Comparative references will be made, where appropriate, to the literatures of French Canada and Australia.
Day Division: 1968-69 (seminar two hours a week).
R. L. McDougall

English 18.599, M.A. Thesis
Members of the Department

French

Professor; Chairman of the Department	J. S. Tassie
Assistant Professor Assistant Chairman	J. Miquet
Professors	L. Fam, C. D. Hérisson
Associate Professors	C. P. Fleischauer, E. F. Kaye, W. Krysinski, E. Kushner, P. Laurette
Assistant Professors	F. Cousin, A. Elbaz, H. Fers, R. Galliani, M. Gaulin, M. Gobeil, W. B. Kay, A. Roth, B. Roy, R. Vigneault
Senior Lecturer	W. M. Fraser
Lecturer	A. Halsall
Special Lecturers	Martine Bérault, Michel Bérault, C. Fam
Sessional Lecturers	B. Burke, M. Coulombe, A. Dabezies, L. Cohen van Delft, P. Demers, J. M. Duciaume, L. A. Finn, J. Fouchier, R. Isaacs, L. Krupka, R. Manning, D. Puschel, S. Russier, M. Vernet
Supervisor of Major Students	To be announced
Supervisor of Honours Students	R. Vigneault
Supervisor of Graduate Students	E. F. Kaye
Coordinator of Second-year Courses	A. Roth

As Carleton University is situated in a bilingual community, students are encouraged to take advantage of the multiple opportunities for practical appreciation of the language. Radio, television, cinema, stage, the press, and everyday conversation are at hand to supplement academic course work. Class lectures are generally conducted in French. The Department also has at its disposal a fully equipped language laboratory.

Major in French

A student wishing to major in French must have 60% standing or better in French 20.100, or 20.101 with permission of the Department. Such a student will take a minimum of five additional courses at the 200/300 level, at least one of which must be a 300 level course. French 20.203* will be compulsory, and at least three courses are to be selected from French 20.210, 20.215, 20.220, 20.225, 20.230, 20.260, 20.305, 20.310. This will help him to consolidate his knowledge of French grammar and to gain a comprehensive view of the various aspects of French literature.

Honours Course

Several honours programs are available. Course patterns are designed to assure a balanced appreciation of all periods of French literature, with competence in oral and written expression in the French language. Interested candidates will note the general regulations governing honours on p. 47. The Department requires in addition that candidates do summer reading, include practical work in the laboratory in *each* year of the program, and sit for a comprehensive examination at the end of the final year.

Honours in French, with Minor in a Second Language

This program is designed for students intending to pursue graduate studies in the field of Romance languages. It normally consists of twenty courses after Grade 13, and will include the study of a second language other than English each year.

a) In the First year the following courses will be chosen:
  English 18.100 or 18.101;
  Philosophy 32.100, 32.105, 32.110 or 32.120, or Humanities 10.100, or Religion 34.100 or 34.120;
  History 24.100 or 24.115;
  French 20.100;
  A course in another language (German or Spanish or Russian or Latin[1]);
  A First year course in Science or Mathematics[2].

b) Nine additional course credits in French will be obtained, as follows:
  i French 20.203* is compulsory
  ii At least four courses are to be selected from French 20.210, 20.215, 20.220, 20.225, 20.230, 20.260, 20.305, 20.310, 20.335, 20.430, 20.440, 20.450, 20.460, 20.470, 20.490
  iii Five of the nine course credits will be at the 300/400 level with a minimum of two at the 400 level.

c) i Three additional course credits in the second language chosen in First year
  ii A further course or courses in an approved option.

Combined Honours

Combined honours programs are available in French and Latin, French and German, French and Russian, French and English, French and Spanish, French and History, French and Political Science.

The Honours programs combining two languages prepare the student either for graduate work or for the Ontario College of Education courses leading to the Interim High School Assistant's Certificate, Type A, and must be planned in close consultation with the departments concerned. The combined programs with History or Political Science are suited for various kinds of public careers.

For First year courses, see a) above. Students combining French and Political Science will take Political Science 47.100 instead of History.

Six additional course credits in French will be taken, as follows:

  i French 20.203* is compulsory;
  ii At least three courses are to be selected in the list of courses shown in b)ii above;
  iii Three of the six course credits will be at the 300/400 level, with a minimum of two at the 400 level.

Six additional credits will be taken in the second honours subject after the 100 level course.

Graduate Studies

The department offers studies leading to the M.A. degree. Emphasis is attached to work in specialized fields, a particular author or period, and research on problems of literary history. A departmental bulletin is available providing more information.

General regulations for graduate studies are found on pp. 88-90. The student for the M.A. in French normally takes a minimum of five courses (without thesis) or three courses plus a thesis, and will also sit for a comprehensive examination. Provision is made for study in the field of Comparative Literature as appropriate (see p. 69).

[1]Students must have standing in Latin 16.010 or equivalent before graduation.
[2]This requirement of the First year may be fulfilled in the Second year.

Courses Offered: 1968-69

Day and Evening: 20.: 001, 010, 100, 101, 102, 201*, 202*, 203*, 301*.
Day only: 20.: 210, 220, 225, 230, 260, 305, 310, 315, 335, 346, 401, 405, 460, 490, 535, 540, 585.
Day or Evening: 20.: 303*, 430.
Evening only: 20.: 215, 505, 521, 530, 570.

French 20.001, Elementary French

An intensive non-credit course preparing students for French 20.010. Grammar and conversation. Students must be prepared to make extensive use of the language laboratory facilities as the course is designed for those who have had no French.
Texts: Harris and Lévêque, *Basic Conversational French.*
Day and Evening Division: Annually (four hours a week, plus practice sessions).
Summer: 1968 *Day and Evening Divisions.*
R. Manning

French 20.010, Readings in Modern French

Selections by modern French authors. Exercises in grammar, vocabulary and style, with emphasis on conversation and composition. Laboratory sessions are compulsory.
Texts: Politzer and Hagiwara, *Active Review of French*;
Hagiwara and Politzer, *Continuons à parler;*
Carlut and Brée, *France de nos jours;*
Others to be announced.
Day Division: Annually (three lectures a week, plus practice session).
Evening Division: Annually (two lectures a week, plus practice session).
Summer: 1968 *Day and Evening Divisions.*
M. Gaulin and Members of the Department

French 20.100, French Literature from La Chanson de Roland to Zola

A course for students who intend to select French as their major subject. Brief but inclusive review of the development of French literature from *La Chanson de Roland* to Emile Zola, with emphasis on reading and study of representative literary works of all types. Discussion groups compulsory.
Texts: Sanders and Creighton, *A travers les siècles.*
Molière, *L'Avare;* Beaumarchais, *Le Barbier de Séville;*
Other texts to be announced.
Reference Texts: Brereton, *A short history of French Literature*; Abry, Audic et Crouzet, *Histoire illustrée de la littérature française;* Salomon, *Précis d'histoire de la littérature française.*
Prerequisite: French 20.010 or equivalent.
Day Division: Annually. (four hours a week, lectures and discussion group).
Evening Division: Annually (two evenings a week).
Summer: 1968 *Day and Evening Divisions.*
C. D. Hérisson and Members of the Department

French 20.101, French literature from the Middle Ages to modern times

A course for students who do not intend to select French as a major subject. An intensive study of selected literary works of all types from the Middle Ages to the twentieth century, including several examples of classical and modern theatre. Discussion groups compulsory.

Texts: Sanders and Creighton, *A travers les siècles.*
Molière, *L'Avare;* Anouilh, *Antigone;* Camus, *La Peste*
Reference Texts: Brereton, *A short history of French literature;* Salomon, *Précis d'histoire de la littérature française;* Hare, *The literature of France.*
Prerequisite: French 20.010 or equivalent.
Day Division: Annually (four hours a week, lectures and discussion group).
Evening Division: Annually (two evenings a week).
E. F. Kaye and Members of the Department
Summer: 1968 *Day and Evening Divisions.*
B. Burke and J. M. Duciaume

French 20.102, French literature, modern authors

A course for students who do not intend to select French as a major subject. An intensive study of selected masterpieces in poetry, novel and theatre from the end of the nineteenth century to the present. Discussion groups compulsory.

Texts: Gide, *La Porte étroite;* Camus, *La Chute;* Sartre, *Le Mur, Huis clos, Les Mouches;* Anouilh, *Antigone;* Sarraute, *L'Ere du soupçon;* Ionesco, *La Cantatrice chauve, Les Chaises;* Butor, *La Modification;* Beckett, *En attendant Godot;* selections from Baudelaire, Rimbaud, Nelligan, Lautréamont, Apollinaire, Breton, Cendrars, Saint-John Perse, Valéry Larbaud, Supervielle, Hébert, Lapointe.
Reference Text: Boisdeffre, *Les Ecrivains français d'aujourd'hui.*
Prerequisite: French 20.010 or equivalent.
Day Division: Annually (lectures three hours a week and discussion group).
Evening Division: Annually (two lectures a week).
W. B. Kay and Members of the Department
Summer: 1968 *Evening Division* (two lectures a week).
M. Vernet

French 20.201*, Le français oral

Phonétique et conversation; travaux de laboratoire.
Texts: *Petit Larousse illustré;* Léon, *Improving French Pronunciation,* Vol. I & II.
Prerequisite: French 20.100 or 20.101 or 20.102 or permission of the Department.
Day and Evening Divisions: Annually (two hours a week throughout the year).
Summer: 1968 *Day and Evening Divisions.*
W. Fraser and Members of the Department

French 20.202*, Explication de texte

Examen détaillé d'un petit nombre de chefs-d'oeuvre pour développer l'art de l'analyse des textes littéraires.
Texts: *Poètes du XVIe siècle* (Cl. Vaubourdolle); La Bruyère, *Les Caractères,* I (Cl. Larousse); J. J. Rousseau, *Discours-Lettre sur les spectacles* (Cl. Larousse); *Verlaine et les poètes symbolistes* (Cl. Larousse).
Prerequisite: French 20.100 or 20.101 or permission of the Department.
Day and Evening Divisions: Annually (two hours a week throughout the year).
Summer: 1968 *Day and Evening Divisions.*
J. Miquet and Members of the Department

French 20.203*, Grammaire française

Révision systématique de la grammaire française. Travaux pratiques.
A compulsory course for Majors and Honours in French.
Texts: Carlut-Meiden, *French for oral and written Review;* Carly-Meiden, *Pattern Practice.*
Suggested Grammar: Grevisse, *Le bon usage.*
Suggested Dictionaries: Harrap's (English-French); J. Dubois (Français).
Prerequisite: A French course of the 100 level, or permission of the Department.
Day and Evening Divisions: Annually (two hours a week throughout the year).
F. Cousin and others

French 20.210, La littérature et la pensée françaises du 17e siècle

Le XVIIe siècle français: la préciosité et le classicisme. De Malherbe, Descartes à la querelle des Anciens et des Modernes. Auteurs spécialement étudiés: Corneille, Molière, La Fontaine, Pascal, Mme de La Fayette, Racine.
Texts: Lagarde et Michard, *XVIIe siècle,* Petits Classiques Bordas.
Prerequisite: French 20.100 or 20.101 or permission of the Department.
Day Division: 1968-69 (three lectures a week).
L. Fam
Summer: 1968 *Evening Division* (two lectures a week).
A. Dabezies

French 20.215, La littérature et la pensée françaises du 18e siècle

Prolongement du classicisme. Les nouvelles idées politiques, sociales, religieuses, philosophiques. Le roman et le théâtre.
Texts: Castex et Surer, *Manuel des études littéraires françaises*: *XVIIIe siècle;* Fellows & Torrey, *Age of Enlightenment,* a choice of paperbacks.
Prerequisite: French 20.100 or 20.101 or permission of the Department.
Evening Division: 1968-69 (two lectures a week).
C. P. Fleischauer

French 20.220, La littérature du 19e siècle

Du romantisme au symbolisme.
Texts: Lagarde et Michard, *XIXe Siècle;* Chateaubriand, *Atala, René* (Garnier); Balzac, *Le Colonel Chabert, Gobseck* (Harrap); Hugo, *Poésies* (Nouveaux Cl. Hatier); Flaubert, *Madame Bovary* (Garnier); Maupassant, *Boule de suif* (L. de Poche).
Prerequisite: French 20.100 or 20.101 or permission of the Department.
Day Division: Annually (three lectures a week).
E. F. Kaye

French 20.225, Littérature française du naturalisme à l'existentialisme

Etude d'un choix d'oeuvres représentatives du XXe siècle.
Texts: Zola, *Germinal* (L. de Poche); Proust, *Un amour de Swann* (L. de Poche); Malraux, *La Condition humaine* (L. de Poche); Giraudoux, *La guerre de Troie n'aura pas lieu* (L. de Poche); Saint-Exupéry, Vol. de nuit (L. de Poche).
Reference Texts: Lagarde et Michard, *XXe Siècle*.
Prerequisite: French 20.100 or 20.101. Major or Honours students may not take this course for credit if they have taken French 20.102.
Day Division: 1968-69 (three lectures a week).
A. Halsall
Summer: 1968 *Day Division* (five lectures a week).
A. Roth

French 20.230, La littérature française depuis l'existentialisme

Prerequisite: French 20.100 or 20.101. Major or Honours students of French may not take this course for credit if they have taken French 20.102.
Day Division: 1968-69 (three lectures a week).
M. Gobeil

French 20.250, Le théâtre: théorie et pratique

Etude de l'histoire du théâtre français et examen détaillé de cinq pièces. Travail pratique au laboratoire et cours d'interprétation théâtrale. Deux pièces de théâtre seront présentées par les étudiants du cours.
Prerequisite: French 20.100.
Not offered, 1968-69.

French 20.260, Littérature canadienne de langue française

Etude de la littérature canadienne faite à la lumière des mouvements tant français qu'américains.
Texts: G. Sylvestre, *Anthologie de la poésie canadienne française;* choix des romans importants depuis *Les Anciens Canadiens.*
Reference Text: Tougas, *Histoire de la littérature canadienne-française.*
Prerequisite: French 20.100 or 20.101 or permission of the Department.
Day Division: 1968-69 (three lectures a week).
J. S. Tassie

French 20.301*, Conversation et traduction

Cours de conversation avancée; l'art de la traduction.
Texts: *Petit Larousse;* Mansion, *A Grammar of Present-day French;* Ritchie, *A New Manual of French Composition.*
Prerequisite: French 20.201* or permission of the Department.
Day and Evening Divisions: Annually (two hours a week throughout the year).
J. Miquet and others

French 20.302*, La dissertation française

Les méthodes de la préparation d'un exercice littéraire sur un sujet donné.
Text: Thoraval, *La Dissertation française.*
Prerequisite: French 20.202*.
Not offered, 1968-69.

French 20.303*, Histoire de la langue française

Le développement de la langue française depuis ses origines.
Texts: Bruneau, *Petite histoire de la langue française.*
Prerequisite: A French course at the 200 level, or permission of the Department.
Day or Evening Division: 1968-69 (one lecture a week).
L. Fam

French 20.305, La langue et la littérature françaises du moyen âge

Initiation à l'ancien français; la littérature médivale depuis les origines jusqu'à Villon.
Texts: G. Raynaud de Lage, *Introduction à l'ancien français.*
A. Mary, *La fleur de la poésie française;* J. Bédier, *La Chanson de Roland.*
Lagarde et Michard, *Moyen Age.*
Prerequisite: A French course at the 200 level and knowledge of Latin.
Day Division: 1968-69 (three lectures a week).
B. Roy

French 20.310, La littérature et la pensée françaises du XVIe siècle

L'humanisme, la renaissance et l'âge de la réforme.
Texts: J. Plattard, *La Renaissance des lettres en France.*
Rabelais, *Tome I* (Les Belles-Lettres).
Montaigne, *Le Troisième Livre* (Les Belles-Lettres).
Du Bellay, *Les Regrets* et *Les Antiquités de Rome* (Droz).
Ronsard, *Les Hymnes de 1555* (Droz).
Choix de Classiques Larousse.
Prerequisite: French 20.210 or permission of the Department.
Day Division: 1968-69 (three hours a week).
E. Kushner

French 20.315, Histoire des idées en France

Topic for 1968-69: Le mouvement des idées au XVIIIe siècle.
Texts: To be announced.
Prerequisite: French 20.210 or 20.215 or permission of the Department.
Day Division: 1968-69 (three lectures a week).
M. Gaulin

French 20.335, L'Essai et le Théâtre dans la Littérature canadienne-française.

L'Essai: Evolution de la pensée — d'Arthur Buies à Jean LeMoyne.
Le Théâtre: Naissance d'une dramaturgie canadienne-française, de Gratien Gélinas à François Loranger.
Texts: To be announced
Prerequisite: French 20.260 (formerly 20.330) or permission of the Department.
Day Division: 1968-69 (three lectures a week).
R. Vigneault

French 20.346, Histoire de la civilisation française

La France contemporaine: premier semestre, les institutions; second semestre, la vie quotidienne des Français.
Texts: Beaujour et Ehrmann, *La France contemporaine.*
Michaud, *Guide France.*
Prerequisite: French 20.210 or 20.215 or 20.220 or permission of the Department.
Day Division: 1968-69 (three hours a week).
A. Elbaz

French 20.401, Stylistique

Méthodes d'étude stylistique. Questions de lexicologie et analyses statistiques.
Prerequisite: French 20.301* or permission of the Department.
Day Division: 1968-69 (two hours a week).
F. Cousin

French 20.402, La bibliographie*

Les sources du travail bibliographique et les méthodes de recherche littéraire.
Texts: Malclès, *La bibliographie;* Bouvier et Jourda, *Guide de l'étudiant en littérature française;* Morize, *Problems and methods of literary history.*
Not offered, 1968-69.

French 20.405, Linguistique générale et linguistique française

Système phonologique du français moderne. Morphologie. Syntaxe.
Prerequisite: French 20.202* or 20.302* or permission of the Department.
Day Division: 1968-69 (two hours a week).
P. Laurette

French 20.430, La critique littéraire en France

La nouvelle critique. Tendances principales de la critique littéraire de langue française, dite *la nouvelle critique;* genèse, développement, aboutissements.
Texts: S. Doubrovsky, *Pourquoi la nouvelle critique. Critique et objectivité* (Mercure de France); R. Picard, *Nouvelle critique ou nouvelle imposture* (Pauvert); R. Barthes, *Critique et vérité* (Seuil).
Prerequisite: French 20.210, 20.215, 20.220 or 20.310.
Day or Evening Division: 1968-69 (two lectures a week).
W. Krysinski

French 20.440, Le roman français

Le roman des XVIIe et XVIIIe siècles.
Prerequisite: French 20.210 or 20.215 or 20.220 or 20.225, or permission of the Department.
Not offered, 1968-69.

French 20.450, La poésie française

Evolution des formes poétiques, des lois de la versification, des thèmes et des symboles.
Prerquisite: French 20.210 or 20.220 or 20.310 or permission of the Department.
Not offered, 1968-69.

French 20.460, Le théâtre en France

Etude des genres dramatiques à travers leurs principaux représentants.
Pendant la session 1968-69 on étudiera le théâtre au XIXe siècle, de A. Dumas à Jarry.
Prerequisite: French 20.210 or 20.215 or 20.220 or 20.225 or permission of the Department.
Day Division: 1968-69 (two hours a week).
C. D. Hérisson

French 20.470, Seminar on a topic of French literature

For honours and graduate students. Topic for Summer 1968: Les moralistes français de Pascal à Sade.
Prerequisite: A course at the 300 level or permission of the Department.
Summer: 1968 *Day Division* (three lectures a week, plus discussion groups).
L. Cohen van Delft

French 20.490, Tutorial

For honours and graduate students. Topic for 1968-69: Le thème du merveilleux dans la littérature française. Prose et poésie.
Text: To be announced
Prerequisite: A course at the 300 level or permission of the Department.
Day Division: 1968-69 (two hours a week).
W. B. Kay

French 20.505, Introduction to Romance linguistics

The historical development of the principal Romance languages, stressing their inter-relationships.
Prerequisites: French 20.305 or 20.310 or Spanish 38.415, and knowledge of Latin.
Evening Division: 1968-69 (two hours a week).
J. S. Tassie

French 20.510, Dialectologie française

Introduction aux méthodes de l'analyse dialectologique. Exploitation de textes primitifs français et canadiens.
Not offered, 1968-69.

French 20.520, Le roman canadien de langue francaise

Topic for 1968-69: Le roman canadien depuis *Maria Chapdelaine*.
Prerequisite: French 20.260 and 20.335 or permission of the Department.
Not offered, 1968-69.

French 20.521, La poésie canadienne de langue française

Etude de Saint-Denys-Garneau, Anne Hébert, Alain Grandbois et la jeune génération.
Prerequisite: French 20.330 or permission of the Department.
Evening Division: 1968-69 (two hours a week).
R. Vigneault

French 20.530, Problèmes de l'histoire littéraire au XVI e siècle

Topic for 1968-69: *Théoriciens littéraires du XVIe siècle.*
Prerequisite: French 20.310.
Evening Division: 1968-69 (two hours a week).
E. Kushner

French 20.535, Aspects du classicisme

Topic for 1968-69: *Racine*
Prerequisite: French 20.210 or 20.460.
Day Division: 1968-69 (two hours a week).
L. Fam

French 20.540, Penseurs et réformateurs du 18e siècle français

Topic for 1968-69: *Voltaire.*
Prerequisite: French 20.215 or 20.315.
Day Division: 1968-69 (two hours a week).
C. P. Fleischauer

French 20.545, Le romantisme

Etude approfondie d'un aspect important du romantisme.
Prerequisite: French 20.220.
Not offered, 1968-69.

French 20.550, Aspects de la littérature du XXe siècle

Prerequisite: French 20.225.
Not offered, 1968-69.

French 20.570, Seminar on a particular author

Study of the work of one of the major authors of French literature. Papers and reports. Topic for 1968-69: *Stendhal.*
Texts: Victor del Litto, *La Vie de Stendhal* (Albin Michel). Choix de classiques Garnier.
Prerequisite: French 20.220 or 20.440 or 20.450 or permission of the Department.
Evening Division: 1968-69 (two hours a week).
E. F. Kaye
Summer: 1968 *Day Division* (three lectures a week, plus discussion groups).
Topic: *Leconte de Lisle.*
C. D. Hérisson

French 20.585, Seminar on a problem of literary history.

Topic for 1968-69: *La poésie parnassienne.*
Prerequisite: French 20.450 or permission of the Department.
Day Division: 1968-69 (two hours a week).
C. D. Hérisson

French 20.599, M.A. Thesis

Geography

Professor	G. C. Merrill
Professor; Chairman of the Department	Philip E. Uren
Associate Professors	Duncan M. Anderson, Denis Fitzgerald, J. Peter Johnson, Jr.
Assistant Professors	S. Mitsuhashi, D. R. F. Taylor, Thomas P. Wilkinson
Sessional Lecturer	Hari S. Anand

Geography undergraduate courses after the First year are categorised as follows:

Group I   Geography 45.250 (Europe)
           Geography 45.315 (North America)
           Geography 45.320 (Humid Tropics)
           Geography 45.330 (Inter-tropical Africa)
           Geography 45.360 (Soviet Union and East Europe)
           Geography 45.430 (Northlands)

Group II   Geography 45.210 (Physical Geography)
           Geography 45.230 (Cultural Geography)
           Geography 45.310 (Geomorphology)
           Geography 45.325 (Cartography)
           Geography 45.340 (Economic Geography)
           Geography 45.345 (Climatology)
           Geography 45.420 (Urban Geography)
           Geography 45.435 (Historical Geography)
           Geography 45.440 (Political Geography)
           Geography 45.445 (Land Resource Use)

Group III Geography 45.200 (Geographic Methods)
           Geography 45.410 (Field Geography)
           Geography 45.490 (Tutorial)
           Geography 45.498 (Honours Research Essay)

Pass Course

Students majoring in Geography in the Pass Course are required to complete six courses in Geography. The program is as follows:
Earth Science 45.100, taken in the First year, with a grade of 60% or better, Geography 45.230, and four additional geography courses, at least one from Group I and at least two from Group II.

Honours Course

Honours programs may be entered from the Honours First year in the Social Sciences (see p. 53) or by transfer from the Pass Course if the appropriate standing has been attained. Students reading for an Honours degree in Geography must satisfy the general University regulations for Honours (see p. 47).

In addition to following a program of courses selected in consultation with the Chairman of the Department, students are required to attend a departmental field course at the beginning of their third year. Geography 45.498 (Honours Research Essay) carries the credit of one full course. In determining the class of an honours candidate's degree, all geography courses will be counted.

The program of courses followed by an honours candidate is outlined below.

Year I
1. English 18.100, 18.101 or 18.102.
2. Philosophy 32.100, 32.105, 32.110 or 32.120, Humanities 10.100 or Religion 34.100.
3. One of: Economics 43.100, History 24.100 or 24.115, Political Science 47.100, Psychology 49.100, Sociology 53.100, Anthropology 54.110.
4. A language other than English (at the 100 level).
5. Earth Science 45.100.

Year II
1. Geography 45.200.
2. Geography 45.210 or one course from Group I.
3. Geography 45.230.
4. ⎫ Two electives, one of which should be preferably a third language, or an
and ⎬ additional year of a second language, or one of Mathematics 69.100, 69.101,
5. ⎭ 69.130 or 69.250.

On completion of YEAR II, the student must choose between the Cultural Geography and the Physical Geography options.

Year III
1.-3. Three courses, one from Group I and two from Group II.

Cultural Geography Option:
4. One course in a Social Science.
5. One elective.

Physical Geography Option:
4. One course in a Physical or Natural Science, OR, one of Mathematics 69.100, 69.101, 69.130, or 69.250 (whichever not taken in Arts II).
5. One elective.

Year IV
1. One course from either of Groups I or II.
2. Geography 45.490.
3. Geography 45.498.

Cultural Geography Option:
     Two courses above the 100 level from the Social Sciences or allied subjects previously selected.

Physical Geography Option:
4. ⎫ Two courses above the 100 level from the natural or physical sciences or allied
and ⎬ subjects previously selected.
5. ⎭

Students wishing to enter the Type A specialist certificate course at an Ontario College of Education are required to complete thirteen courses in geography for credit. They are advised to consult the Department as early as possible in order that an appropriate program can be arranged.

Graduate Studies

The Department of Geography offers studies leading to the degree of Master of Arts to full-time students. Thesis topics must be chosen from the following fields of faculty interest and experience: historical geography of Canada, the Caribbean area or Africa; geomorphology and glaciology; certain aspects of political geography; non-urban recreational and agricultural land resource use of Canada; economic geography.

The candidate will be required to:

a) meet the requirements for entry and graduation as set by the Faculty of Graduate Studies,
b) take Geography 45.500 and 45.590,
c) take one additional approved course,
d) prepare a thesis (Geography 45.599), and defend it,
e) demonstrate a reading knowledge of a language other than English.

Earth Science 45.100

Introduction to analysis of maps and aerial photographs. Earth as a planet; rocks and minerals; the earth's crust, the major land forms, deformation and movements; the agents of erosion; the genetic study of land forms; climate and oceans; soils and vegetation.

(Arts students who have fulfilled their Qualifying year science requirement by taking Geology 67.100 cannot take Earth Science 45.100 to satisfy their First year science requirement.)

Text: To be announced.
Day Division: Annually (lectures two hours a week, laboratory two hours a week, two field excursions).
J. P. Johnson and T. P. Wilkinson

Geography 45.112*, Elements of Physical Geography

The agents of erosion; the genetic study of land forms; climate and oceans; soils and vegetation.
Day Division: 1968-69 (lectures two hours a week, laboratory two hours a week, one field excursion. This course is the second term of Earth Science 45.100).
T. P. Wilkinson

Geography 45.200, Geographic Methods

A service course intended to equip the specialist in Geography with an understanding of the techniques used in the present day analysis of geographic phenomena.
Reference Texts: To be announced.
Day Division: Annually (lectures two hours a week, laboratory two hours a week).
T. P. Wilkinson and Members of the Department

Geography 45.210, Physical Geography

The physical elements of the earth's surface and atmosphere and their geographic significance.
Reference Texts: To be announced.
Prerequisite: Earth Science 45.100 or permission of instructor.
Day Division: Annually (lectures two hours a week, laboratory two hours a week).
J. P. Johnson and T. P. Wilkinson

Geography 45.230, Cultural Geography

The development and distribution of human societies with particular reference to both culture and habitat.
Text: Dohrs and Sommers, *Cultural Geography: Selected Readings.*
Reference Text: Brock and Webb, *A Geography of Mankind.*
Day and Evening Divisions: 1968-69 (lectures and discussion three hours a week).
G. C. Merrill and P. E. Uren

Geography 45.250 [450], Europe

The physical and cultural regions of Europe will be examined. Emphasis will be placed on the influence of the varying physical and cultural resources on the evolving patterns of European organization and relationships, with particular stress on Western Europe.
Reference Texts: Gottmann, *A Geography of Europe,* 3rd edition.
Dollfus, *Atlas of Western Europe.*
Prerequisites: Earth Science 45.100, Geography 45.112, or permission of the Department.
Day Division: 1968-69 (lectures and discussion three hours a week).
D. M. Anderson

Geography 45.315 [215], North America

This course outlines the physical, historical and economic geography of North America as a whole. Principal regions of the continent are dealt with in detail.
Text: Watson, *North America.*
Reference Text: Mead and Brown, *The United States and Canada.*
Prerequisite: Earth Science 45.100, or Geography 45.112, or permission of the Department.
Not offered, 1968-69.

Geography 45.310, Geomorphology

Geomorphic processes, their related landforms and analysis. (This course also listed as Geology 45.413).
Reference Texts: To be announced.
Prerequisite: Geography 45.210 or permission of the instructor.
Day Division: Annually (lectures two hours a week, field trips two hours a week).
J. P. Johnson and T. P. Wilkinson

Geography 45.320, Geography of the Humid Tropics

A comprehensive regional study of the humid tropical environment with special emphasis upon Latin America, the Caribbean and Africa. Indigenous economics; the social and economic problems and potentialities of developing areas.
Reference Texts: Pierre Gourou, *The Tropical World;*
George H. T. Kimble, *Tropical Africa,* Two Volumes.
Prerequisite: Earth Science 45.100 or Geography 45.112.
Not offered, 1968-69.

Geography 45.325, Cartography

The history and development of map making. The compilation, production and uses of the modern topographic map. Special purpose maps and their use, construction and development.
Reference Texts: Raisz, *Principles of Cartography*.
Robinson, *Elements of Cartography*.
Monkhouse and Wilkinson, *Maps and Diagrams*.
Prerequisite: Permission of the instructor.
Day Division: 1968-69 (lectures and laboratory four hours a week).
D. R. F. Taylor

Geography 45.330, Inter-tropical Africa

Geographical aspects of the problems and potential of the developing nations of inter-tropical Africa. The interaction of men and environment will be examined as well as the historical developments which have led to some of the present day situations.
Reference Texts: To be announced.
Prerequisite: Earth Science 45.100, or Geography 45.112, or permission of the instructor.
Day Division: 1968-69 (lectures and discussion three hours a week).
D. R. F. Taylor

Geography 45.340, Economic Geography

Basic concepts of location theory. These concepts are applied to the study of the regional interrelation of economic activities in the world, with special emphasis on Canada.
Reference Texts: Hoover, *Location of Economic Activity*.
Berry, *Geography of Market Centers*. and *Retail Distribution*.
Prerequisite: Geography 45.230 or permission of the instructor.
Day Division: 1968-69 (lectures and discussion three hours a week).
S. Mitsuhashi

Geography 45.345, Climatology

Physical, dynamic and applied climatology: synoptic meteorology, weather modifications with special reference to arid areas; general circulation; microclimatology.
Reference Texts: Pettersen, *Introduction to Meteorology;*
Hare, *The Restless Atmosphere*.
Prerequisite: Geography 45.210 or permission of instructor.
Evening Division: 1968-69 (lectures and discussion three hours a week).
H. Anand

Geography 45.360, Soviet Union and East Europe

This course examines the geographic basis of Soviet and East European society. Particular emphasis is placed on the role of physical factors, including location, size, climate, vegetation, and soils in the economic and political development of the Soviet Union and East Europe.
Reference Texts: To be announced.
Prerequisite: Earth Science 45.100, or Geography 45.112, or permission of the Department.
Not offered, 1968-69.

Geography 45.410, Field Geography

The principles and techniques of analysis, mapping and recording data in the field. Honours students are expected to attend this course at the beginning of Year III but for no course credit. Further information may be had on application to the Department.
The field camps for this course will be held from August 30 to September 7, 1968.
Members of the Department

Geography 45.420, Urban Geography

Study of urban systems: size, spacing, function of cities. Economic base, central place theory, urbanization and economic development. Analysis of internal structure of cities with emphasis on principles of land use and systems of circulation.
Reference Texts: Murphy, *The American City: An Urban Geography*.
Mayer and Kohn, *Readings in Urban Geography*.
Prerequisite: Geography 45.230 or permission of the instructor.
Day Division: 1968-69 (lectures and discussion three hours a week).
S. Mitsuhashi

Geography 45.430, Geography of the Northlands

An analysis of the physical characteristics, historical geography, economic resources, settlement patterns and problems, and the future development of Arctic and Sub-arctic lands. Particular emphasis is placed on Canada, Scandinavia and the U.S.S.R.
Reference Texts: G. H. Kimble and D. Good, *Geography of the Northlands*.
P. Baird, *Polar Regions. The Canadian Oxford Atlas*.
Prerequisites: Earth Science 45.100, Geography 45.112, or permission of the Department.
Evening Division: 1968-69 (lectures two hours a week).
D. Fitzgerald

Geography 45.435 [235], Historical Geography

A study is made of the relation of man, habitat, and economy of past eras. The role of man as an ecologic dominant is stressed. The geographic setting of the past is reconstructed for a number of societies.
Reference Texts: To be announced.
Prerequisites: Earth Science 45.100, Geography 45.112, or permission of the instructor.
Day Division: 1968-69 (lectures and discussion three hours a week).
D. Fitzgerald

Geography 45.440, Political Geography

This course examines the geographic structure of the nation state, including capitals and "core areas", boundaries and frontiers, and global patterns of political activity.
Text: Van Cluj, *Systematic Political Geography*.
Prerequisite: Geography 45.230 or permission of the Chairman of the Department.
Day Division: 1968-69 (lectures and discussion three hours a week).
P. E. Uren

Geography 45.445, Land Resource Use

This course will examine, from both theoretical and empirical approaches, the nature and problems of man's use of land resources. The emphasis will be on non-urban land use in contemporary western culture. The impact of the urbanization process on land use patterns and conflicts will be explored in detail. Fourth year honors students.
Prerequisite: Permission of the Chairman of the Department.
Day Division: 1968-69 (lectures and discussion three hours a week).
D. M. Anderson

Geography 45.490, Tutorial in Geography

The development of ideas and methods in Geography. Examination and discussion of original works.
Prerequisite: Permission of the Chairman of the Department.
Day Division: Annually (hours arranged).
Members of the Department

Geography 45.498, Honours Research Essay

Candidates for Honours in Geography are required to write an Honours Research Essay during their final year. The subject for research will be determined in consultation with the Department and a supervisor will be assigned. The candidate will be orally examined upon his essay after presentation.
Prerequisite: Permission of the Chairman of the Department.
Day Division: Annually (hours arranged).
Members of the Department

Geography 45.500, Methodology

A seminar in the history of geographical thought and methodology.
Day Division: 1968-69 (seminar two hours a week).
Members of the Department

Geography 45.590, Graduate Tutorial in Geography

A systematic field will be selected for special study on a tutorial basis.
Day Division: Annually (hours arranged).
Members of the Department

Geography 45.599, M.A. Thesis

Candidates will prepare a thesis based upon their own research, and defend it by an oral examination. The thesis is equivalent to two full courses.

Geology

Professor	F. K. North
Associate Professor; Chairman of Department	R. W. Yole
Associate Professors	G. Y. Chao, J. A. Donaldson, A. F. Gregory, P. A. Hill, J. M. Moore, Jr., (on leave of absence, 1968-69), W. M. Tupper
Assistant Professors	K. Hooper, G. B. Skippen
Special Lecturer	R. W. Boyle
Sessional Lecturers	A. J. Baer, R. L. Borden, P. J. Hood, E. Irving
Chief Demonstrator	J. L. Craft
Demonstrators	J. G. MacDonald, Mary A. Wickens

The proximity of the University to libraries, research offices, and laboratories of the Geological Survey of Canada, the Dominion Observatory, the Mines Branch, and the National Research Council, enables undergraduate and graduate students in the Geological Sciences to make contact with leading workers in their fields. Lectures by visiting scientists and meetings of various technical groups are open to students of the University.

B.Sc. Program

The B.Sc. program in Geology is of four years duration beyond Senior Matriculation. A total of twenty courses is required as follows:

a) The course requirements of the Qualifying University and First years of the general B.Sc. program (p. 73).

b) At least ten courses in Geology, of which Geology 67.100 and all second and third year courses are mandatory (Geology 67.100 may be taken in either Qualifying or First year).

c) At least six courses in the other sciences, including Mathematics[1]. Among these, Mathematics 69.100 is mandatory, and at least two first year science or mathematics courses must be passed before registration for second year Geology courses will be permitted.

d) Three non-Science, non-Mathematics courses.

e) One course chosen from Science, Arts or Engineering.

A three-year program, leading to a non-professional B.Sc. degree with major in Geology is also available. Requirements are the same as for the B.Sc. program outlined above, except that no courses above the 300 series are required, and the total courses will number fifteen, including seven Geology courses and at least five science courses outside of Geology, including Mathematics 69.100.

(Note: The new Second year program offered in 1968-69 will be followed by a similar revised Third year program in 1969-70, replacing the current 300 series courses. For courses in which Geology 67.220, 67.230 or 67.272* are listed as prerequisites, reference should be made to 1967-68 calendar).

B.Sc. (Honours) Program

a) University requirements concerning Honours standing must be maintained (p. 47 and pp. 73-74).

b) Courses as prescribed for the B.Sc. program are required, except that Geology 67.498 (thesis) is one of the mandatory courses in Geology, and Mathematics 69.201 (or other advanced course in Mathematics) is a mandatory course in the group of six required in other sciences.[1]

[1]All major and honours students should note that their selection of science courses, including Mathematics, should be made with the prerequisites for Fourth year Geology courses in mind.

c) The Science Faculty languages requirement must be met (p. 74) by demonstrating reading proficiency in French, German or Russian.

d) A language other than English must be one of the three non-Science non-Mathematics courses chosen.

e) A comprehensive oral examination is given at the end of Fourth year.

Graduate Studies

The Department offers instruction leading to the degrees of Master of Science and Doctor of Philosophy. Details may be obtained from the Chairman.

The candidate for the Master of Science degree will be required to:

a) comply with the general regulations of the Faculty of Graduate Studies, (p. 88)

b) if entering from another University, write a preliminary orientation examination in the geological sciences, covering those fields in which he claims competence at the undergraduate level,

c) take Geology 67.500,

d) take two additional 500 series courses, or, in special cases, two full courses in an ancillary science at the Honours level which may be substituted on recommendation of the student's supervisory committee,

e) take such additional non-credit courses in ancillary sciences or Geology as may be required by the supervisory committee,

f) demonstrate a reading knowledge of geological subjects in a language other than English, relevant to his field of research and acceptable to the Department,

g) prepare a thesis based on the candidate's own research, and defend it.

The candidate for the degree of Doctor of Philosophy will be required to:

a) comply with the general regulations of the Faculty of Graduate Studies,

b) prove his ability to do guided research either through satisfactory completion of a M.Sc. thesis, or by having reports or published papers to his credit which demonstrate his research ability,

c) take a preliminary orientation examination if entering from another university,

d) take Geology 67.500, and at least one other graduate course in Geology prescribed by the Department,

e) take such other formal or directed reading courses as may, in the opinion of his supervisory committee, be desirable as preparation for the comprehensive examinations.

f) demonstrate a reading knowledge of geological subjects in a language other than English, relevant to his field of research and acceptable to the Department,

g) take comprehensive examinations consisting of written papers in two fields of geology, and an oral examination,

h) prepare a thesis, on a problem formulated by the candidate, which should be a contribution to basic knowledge in the geological sciences or immediately related fields,

i) defend his thesis in public.

In the following listing, full courses end in "0" or "5", half courses (first term) in '1' or '3', and half courses (second term) in '2' or '4'. An asterisk follows all half-courses.

Geology 67.100, General Geology

The earth in space; evolution of the continents and oceans; rocks and minerals; mountain building and deformation; the cycle and agents of erosion; the history of life and the growth of geological ideas.
Text: Stokes and Judson, *Introduction to Geology*.
Day Division: Annually (lectures two hours a week, laboratory three hours a week, two field excursions in the first term).
Evening Division: 1968-69 (lectures and laboratories five hours a week, two half-day field excursions first term, one full day excursion after the final examinations).
Note: If Geology 67.100 has been taken previously, Earth Science 45.100 will carry only a half credit, and vice versa.
A. J. Baer, A. F. Gregory and F. K. North

Geology 67.201*, Introductory Geology for Engineers

Fundamentals of geology with emphasis on engineering aspects.
Text: Fagan, *View of the Earth* or Stokes and Judson, *Introduction to Geology*.
Reference Text: Holmes, *Principles of Physical Geology*.
Day Division: 1968-69 (lectures three hours a week, laboratory three hours a week, two field excursions, offered in both terms.
P. A. Hill (first term).
J. A. Donaldson (second term)

Geology 67.221* (220 in part), Crystallography and Optical Mineralogy

Morphological study and classification of crystals, lattice theory, X-ray techniques, principles of optical crystallography.
Text: Bloss, *Introduction to the Methods of Optical Crystallography*.
Reference Texts: Berry and Mason, *Mineralogy*.
Deer, Howie and Zussman, *Introduction to the Rock-forming Minerals*.
Prerequisite: Geology 67.100.
Day Division: 1968-69 (lectures two hours a week, laboratory three hours a week, first term).
G. Y. Chao and others

Geology 67.225 (220, 350 in part), Mineralogy and Petrology I

Introduction to crystal chemistry, physical mineralogy and systematic mineralogy, petrography of igneous, sedimentary and metamorphic rocks.
Texts: Berry and Mason, *Mineralogy*.
Deer, Howie and Zussman, *Introduction to the Rock-forming Minerals*.
Reference Texts: Bayly, *Introduction to Petrology,* Harker's Petrology for students.
Wahlstrom, *Petrographic Mineralogy*.
Williams, Turner and Gilbert, *Petrography*.
Prerequisite: Geology 67.100.
Day Division: 1968-69 (lectures two hours a week, laboratory three hours a week).
G. Y. Chao and G. B. Skippen

Geology 67.235 (230, 360 in part), Palaeontology and Stratigraphy I

Principles of palaeontology, stratigraphy and sedimentology. Regional geology of North America.
Texts: Clark and Stearn, *Geological Evolution of North America.*
Other to be announced.
Reference Texts: G.S.C. Geology & Economic Minerals of Canada, 5th edition.
Krumbein and Sloss, *Stratigraphy and Sedimentation.* 2nd edition.
Prerequisite: Geology 67.100.
Day Division: 1968-69 (lectures two hours a week, laboratory three hours a week).
K. Hooper and R. W. Yole

Geology 67.284 (272*, 310 in part), Structure and Geophysics I*

Basic field techniques, geological reports, joints, faults, folds and introductory geophysics. With a mandatory 14-day field camp in the spring.
Texts: Billings, *Structural Geology* 2nd edition.
Compton, *Manual of Field Geology.*
Reference Texts: Holmes, *Principles of Physical Geology.*
Miller, *Photogeology.*
Lattman and Ray, *Aerial Photographs in Field Geology.*
Prerequisite: Geology 67.100.
Day Division: 1968-69 (lectures two hours a week, laboratory three hours a week, second term).
P. A. Hill and A. F. Gregory

Geology 67.310, Structural Geology

Primary and secondary structures and their origins. Laboratory: the use of maps and air photographs; mathematical and graphical solution of depth, fold, and fault problems; structures as seen under the microscope; field problems.
Reference Texts: Billings, *Structural Geology,* 2nd edition.
Compton, *Manual of Field Geology.*
Hills, *Elements of Structural Geology.*
Prerequisites: Geology 67.100, 67.272*.
Day Division: 1968-69 (lectures two hours a week, laboratory three hours a week).
P. A. Hill

Geology 67.350, Petrology

Introduction to the elements of thermodynamics and phase chemistry applicable to petrology. The composition, classification, fabric, occurrence, association and origin of the igneous, sedimentary, and metamorphic rocks. Laboratory: The optical properties of rock forming minerals. Megascopic and microscopic examination of rocks.
Texts: Bayly, *Introduction to Petrology;*
Harker, *Petrology for Students.*
Reference Text: Turner, *Metamorphic Petrology.*
Williams, Turner & Gilbert, *Petrography.*
Prerequisites: Geology 67.220, Chemistry 65.100.
Day Division: 1968-69 (combined lectures and laboratory six hours a week).
Lecturer to be announced.

Geology 67.360, Historical Geology

Principles of sedimentation and stratigraphy. Historical geology of North America. Systematic review of Precambrian, Palaeozoic, Mesozoic, and Cenozoic stratigraphy and fossils.
Text: Clark and Stearn, *Geological Evolution of North America.*
Reference Texts: Kay and Colbert, *Stratigraphy and Life History.*
Krumbein and Sloss, *Stratigraphy and Sedimentation.*
Prerequisite: Geology 67.230.
Day Division: 1968-69 (lectures three hours a week with assignments).
F. K. North

Geology 45.413, Geomorphology

(Offered as Geography 45.310, Principles of Geomorphology. See Department of Geography).

Geology 67.420, Metallic and Non-metallic Mineral Deposits

The geology, classification, occurrence and formation of mineral deposits. The phase chemistry of common sulphide and oxide systems, and its application to the study of mineral deposits. Eh-pH controls. Introduction to mining methods, diamond drilling, sampling, ore calculations, mineralography, metallurgy and property valuation.

Geology of non-metallic minerals; structural, industrial and chemical minerals; ceramics and refractories; abrasives; fertilizers; gemstones; the fossil fuels; ground water.

Laboratory includes visits to local mines and industrial mineral laboratories.
Texts: Park and MacDiarmid, *Ore Deposits.*
Bates, *Geology of Industrial Rocks and Minerals.*
Reference Texts: Bateman, *Economic Mineral Deposits.*
Lindgren, *Mineral Deposits.*
Parkes, *Examination and Evaluation of Mineral Property.*
Prerequisites: Geology 67.310, 67.350.
Day Division: 1968-69 (lectures, laboratories and seminars six hours a week).
W. M. Tupper

Geology 67.422*, Structural Mineralogy of Rock-forming Silicates

Internal symmetry of crystals, space groups and space group symmetry operations, crystal chemistry of rock-forming silicates.
Reference Texts: Evans, *An Introduction to Crystal Chemistry.*
Bragg and Claringbull, *Crystal Structure of Minerals.*
Deer, Howie and Zussman, *Rock-forming Minerals.*
Prerequisites: Geology 67.225, 67.221* or 67.220.
Day Division: 1968-69 (Two hours lecture, four hours laboratory and seminars weekly, second term).
G. Y. Chao

Geology 67.432*, Micropalaeontology

Introduction to microfossils. Kinds of microfossils, their historical sequence and bio-stratigraphic significance. Micropalaeoecology. Local and regional correlation. Laboratory: examination and identification of microfossils.
Text: To be announced.
Reference Texts: Cushman, *Foraminifera.*
Glaessner, *Principles of Micropalaeontology.*
Prerequisite: Geology 67.230.
Day Division: 1968-69 (lectures and laboratories five hours a week; assignments to be arranged, second term).
K. Hooper

Geology 67.452*, Igneous and Metamorphic Petrology

Detailed examination of classical problems in petrology. Principles of phase equilibria and graphical representation of mineral systems. Laboratory: the study of igneous and metamorphic suites, introduction to petrographic calculations, and other advanced laboratory techniques.
Reference Texts: Kern and Weisbrod, *Thermodynamics for Geologists.*
Winkler, *Petrogenesis of Metamorphic Rocks.*
Turner and Verhoogen, *Igneous and Metamorphic Petrology.*
Prerequisites: Geology 67.350, Chemistry 65.210.
Day Division: 1968-69 (seminars and laboratory six hours a week, second term).
G. B. Skippen

Geology 67.463* (462*), Sedimentology

Review of sedimentary processes. Composition, texture, primary structure and origin of the major sedimentary rock types. Dispersal patterns, sedimentary trends, and lithofacies. Laboratory: textural analyses, heavy minerals, statistical analysis of data, and thin-section petrography.
Text: Pettijohn, *Sedimentary Rocks,* 2nd edition.
Reference Texts: Krumbein and Pettijohn, *Manual of Sedimentary Petrography.*
Milner, *Sedimentary Petrography.*
Prerequisite: Geology 67.350.
Day Division: 1968-69 (lectures and laboratory five hours a week, first term).
J. A. Donaldson

Geology 67.480, Physics and Chemistry of the Earth

Physical and chemical properties and characteristics of the earth. Inferred physico-chemical processes active throughout geologic time.
Text: Jacobs, Russell, and Wilson, *Physics and Geology.*
Reference Texts: Garrels and Christ, *Solutions, Minerals and Equilibria.*
Mason, *Principles of Geochemistry.*
Prerequisites: Chemistry 65.100, Mathematics 69.100, Physics 75.100 or 75.105, Geology 67.350.
Day Division (first term), and *Evening Division* (second term): 1968-69 (lectures three hours a week).
E. Irving, G. B. Skippen and others

Geology 67.483*, Applied Geochemistry

Chemical and physical factors responsible for the distribution and migrations of the elements in the lithosphere, hydrosphere, atmosphere and biosphere; geochemistry applied to mineral exploration; methods of analysis. Laboratory: determination of trace amounts of the common metallic elements in soils and stream sediments: case histories; research problems, field trips.
Text: Hawkes and Webb, *Geochemistry in Mineral Exploration*.
Reference Text: Ginzburg, *Principles of Geochemical Prospecting*.
Prerequisites: Geology 67.100, 67.225 (may be taken concurrently), or 67.220, Chemistry 65.100.
Day Division: 1968-69 (combined lectures and laboratory five hours a week, first term).
W. M. Tupper

Geology 67.484*, Exploration Geophysics

An introduction to the fundamental theory and application of geophysics to economic and structural geology. Methods studied are electrical, gravitational, magnetic, radioactive, and seismic. Case history studies integrate the application of the methods.
Text: Dobrin, *Introduction to Geophysical Prospecting*, 2nd edition.
Reference Texts: Jakosky, *Exploration Geophysics*.
Parasnis, *Principles of Applied Geophysics*.
Prerequisite: Physics 75.100, or 75.105, or permission of the instructor.
Evening Division: 1968-69 (lectures and laboratory four hours a week, second term).
A. F. Gregory, P. J. Hood and others

Geology 67.498, Honours Thesis

The B.Sc. thesis is to be based on a nonconfidential problem, undertaken either during the summer under adequate supervision, or during the University year in the Ottawa area under the supervision of the student's adviser. Equivalent to one full course.

Graduate Courses

With the exception of Geology 67.500, most graduate courses are offered in alternate years.

Geology 67.500

Mandatory: A two year seminar course of one hour weekly or semi-monthly. Problems are presented by graduate students, and discussed by graduates and staff.

Geology 67.505, Mineral Economics

The principles of economics as applied to the mineral industries, and the economic geology of the more significant mineral industries.
Reference Text: AIMME, *Economics of the Mineral Industries*.
Prerequisites: Geology 67.420, and Economics 43.100, or permission of instructor.
Evening Division: 1968-69 (lectures three hours weekly, with assignments).
R. L. Borden

Geology 67.510, Geotectonics

The architecture of the globe.
Reference Texts: To be assigned.
Prerequisites: Geology 67.310, 67.350, and 67.360.
Not offered, 1968-69.

Geology 67.520, Advanced Mineral Deposits

Theories of ore deposition are examined in detail.
Text: Bateman, *Economic Mineral Deposits.*
Reference Texts: Bates, *Geology of Industrial Rocks and Minerals.*
AIMME, *Industrial Minerals and Rocks.*
USBM, *Mineral Facts and Problems.*
Prerequisite: Geology 67.420.
Not offered, 1968-69.

Geology 67.525, Advanced Crystallography

Principles and techniques of X-ray crystallography; interpretation of X-ray photographs and application to the study of minerals.
Reference Text: Buerger, *X-ray Crystallography.*
Prerequisite: Geology 67.221*, 67.225 or 67.220.
Day Division: 1968-69 (lectures and laboratory, six hours weekly).
G. Y. Chao

Geology 67.531, 67.532*, Advanced Palaeontology*

The morphology, classification, palaeoecology and geological history of one or more invertebrate fossil groups. Normally the course consists of *either,* (1) Foraminifera (Geology 67.531*) or Ostracoda (Geology 67.532*) or both, *or* (2) other invertebrate groups, mainly macrofossil.
Reference Texts: To be announced.
Prerequisite: Geology 67.230 or 67.235. Geology 67.431 may be taken concurrently. Biology 61.360 is recommended.
Day Division: 1968-69 (five hours weekly).
K. Hooper

Geology 67.534, Palynology*

The taxonomy of fossil pollen and spores. Field and laboratory techniques. Principles of pollen analysis; interpretation of pollen diagrams. Statistical methods. Application of pollen and spore analysis to geological problems.
Text: Faegri & Iversen, *Textbook of Pollen & Spore Analysis.*
Reference Text: To be announced.
Prerequisites: Geology 67.230 or 67.235, 67.431 and permission of the instructor. Recommended Biology 61.210, 61.440.
Day Division: 1968-69 (five hours weekly, second term).
K. Hooper

Geology 67.550, Advanced Petrology

The physical and chemical principles of igneous and metamorphic phenomena, with special emphasis on phase equilibria.
Reference Texts: Levin et al., *Phase Diagrams for Ceramists*.
Korzhinskii, *Physicochemical Basis of the Analysis of the Paragenesis of Minerals*.
Turner and Verhoogen, *Igneous and Metamorphic Petrology*.
Prerequisites: Chemistry 65.210, Geology 67.451.
Not offered, 1968-69.

Geology 67.560, Stratigraphy and Sedimentology

Selected problems in sedimentary geology. The application of modern techniques of stratigraphic, petrologic and statistical analysis.
Reference Texts: Weller, *Stratigraphic Principles and Practice*.
Krumbein and Sloss, *Stratigraphy and Sedimentation*.
Potter and Pettijohn, *Paleocurrents and Basin Analysis*.
Prerequisites: Geology 67.235, 67.350, 67.360, 67.463.
Day Division: 1968-69 (seminars and laboratory five hours a week).
R. W. Yole

Geology 67.572*, Instrumental Analysis

The theory and techniques of instrumental methods of analysis as they apply to problems in the earth sciences. Atomic and molecular absorption spectroscopy, emission spectroscopy, X-ray methods, mass-spectroscopy (part of Chemistry 65.431 and comprise two thirds of course), silicate analysis, electron probe and other methods of specific interest. (Offered in part in the Department of Chemistry as Chemistry 65.431*).
Texts: Willard, Merritt & Dean, *Instrumental Methods of Analysis*.
Smales and Wager, *Methods in Geochemistry*.
Reference Texts: To be announced.
Prerequisites: Chemistry 65.250 and permission of the instructors.
Day Division: 1968-69 (lectures, seminars, and laboratory five hours a week).
G. B. Skippen, W. M. Tupper

Geology 67.580, Advanced Inorganic Geochemistry

The geochemical classification of the elements; abundance of the elements; periodic table; bonding; hydrolysis; complex ions; colloids; oxidation-reduction; metamorphism; diffusion; isotopes; metallic mineral deposits.
Reference Texts: To be announced.
Prerequisites: Geology 67.420; Chemistry 65.250, and preferably 65.350.
Evening Division: 1968-69 (lectures and seminars three hours a week).
R. W. Boyle

Geology 67.583*, Physics of the Earth

The gravity, seismology, geomagnetism, and physics of the earth's interior.
Reference Texts: To be announced.
Prerequisites: Mathematics 69.100, Physics 75.100 or 75.105.
Evening Division: 1968-69 (lectures three hours a week, first term).
E. Irving

Geology 67.584*, Chemistry of the Earth

The material in Geology 67.480 at a more advanced level. The basic principles of chemistry as they apply to problems in geochemistry. The chemistry and genesis of igneous, metamorphic and sedimentary rocks. The geochemistry and evolution of the hydrosphere, atmosphere and biosphere. The geochemical cycle.
Reference Texts: Mason, *Principles of Geochemistry*.
Garrels and Christ, *Solutions, Minerals & Equilibria*.
Prerequisites: Geology 67.350 and preferably Chemistry 65.350.
Day Division: 1968-69 (lectures three hours a week, second term).
G. B. Skippen

Geology 67.585, Physical Geochemistry

Application of thermodynamics to geologic problems. Experimental study of mineral equilibria.
Prerequisites: Chemistry 65.210, Geology 67.451.
Not offered, 1968-69.
G. B. Skippen

Geology 67.590, Directed Studies

Directed reading or directed laboratory studies in fields closely related to the graduate student's thesis problem, under the guidance of selected extramural or intramural directors.

Geology 67.599, M.Sc. Thesis

Equivalent to two full courses.

Geology 67.699, Ph.D. Thesis

Equivalent to five full courses.

German

Professor; Chairman of
Department   E. M. Oppenheimer
Associate Professor   Jutta Goheen
Assistant Professors   R. D. Gould, Anna M. Rosenberg, H.-H. Schmidt
Sessional Lecturers   R. Aksim, J. Bruhwiler, Trudy Kassner, D. Richards

Major in German

A minimum of five courses (beyond German 22.015); in addition to German 22.100 these normally include German 22.250 and at least one of the composition-conversation series. It is possible to elect German and another subject for a combined major program. Early consultation with the departments concerned is advised.

Honours Courses

a) *Honours in German.* Completion of nine courses in German (including German 22.100 or equivalent) is required. They are chosen with due regard to the student's interests and needs and will include work in composition and conversation. An Honours Essay for one course credit is optional.

b) *Combined Honours.*
The following Honours programs are offered: German and Russian (p. 290), German and English (p. 170), German and French (p. 182). This last combination fulfills the certificate requirements of the Ontario College of Education, with emphasis on all periods of modern German literature and regular opportunity for oral and written practice throughout the program. All programs, including combinations which may be proposed to the departments concerned for approval, are designed to serve as a basis for further work in German at the graduate level. In this latter case the student is advised to elect German 22.430. Ordinarily seven course credits in each of the two subjects are required. Provision may be made in the final year for independent study in a particular field of concentration. Regulations governing honours standing are found on pp. 47 and 52.

Language Laboratory facilities are used in German 22.015 and 22.100.

Students are urged to use the reading and conversation room in Paterson Hall.

Graduate Studies

An M.A. program in German is offered by the department. General regulations for graduate studies are found on pp. 88-90. Departmental requirements (admission to candidacy, thesis-colloquium, M.A. reading list, comprehensive examination) are explained in an information sheet obtainable on request. The Department also participates in the Comparative Literature program described on p. 69.

German 22.015, Elementary German

An introduction to the essentials of German grammar and composition; oral practice. Attendance at classes and laboratory sessions is compulsory. Guidance in the reading of scientific texts is available.
Day and Evening Divisions: Annually (four hours, including one laboratory period a week).
Summer Session: 1968 *Day Division* (ten hours a week); *Evening Division* (five hours a week).
Members of the Department

German 22.100, Intermediate German

Review and practice in written and spoken German. Readings from German literature, including plays of Goethe, Brecht, or Dürrenmatt.

The course will be given in two equivalent versions, (A) being primarily for students from German 22.015 and (B) primarily for students from Ontario Grade 13. The Department reserves the right to assign students to A or B as appropriate.

Prerequisite: Ontario Grade 13 German, or German 22.015, or permission of the Department.

Day and Evening Divisions: Annually (four hours, including one laboratory period a week).

Summer Session: 1968 *Day Division* (ten hours a week); *Evening Division* (five hours a week).

Members of the Department

German 22.201* (206*), Intermediate Conversation

Work in small groups with special emphasis on every-day German.

Prerequisite: Permission of instructor. (May be taken concurrently with German 22.100).

Day and Evening Divisions: 1968-69 (two hours a week, *both* terms).

H.-H. Schmidt

German 22.202* (205*), Intermediate Composition

Expansion of the active vocabulary within the framework of current prose usage.

Prerequisite: German 22.100 or permission.

Day and Evening Divisions: 1968-69 (two hours a week, *both* terms).

R. D. Gould

German 22.250, German Literature of the 18th Century

The literature of Enlightenment, Storm and Stress, and Early Classicism, with special emphasis on the works of Lessing, Goethe and Schiller.

Prerequisite: German 22.100 or equivalent.

Day or Evening Division: 1968-69 (three hours a week).

H.-H. Schmidt

German 22.280, German Literature of the Twentieth Century

Shorter selections for orientation and detailed treatment of representative texts.

Prerequisite: German 22.100 or equivalent.

Not offered, 1968-69.

German 22.301*, Advanced Conversation

Work in small groups with special emphasis on idiomatic German. Survey of phonetics. Discussion of current issues. Production of a (radio) play.

Prerequisite: German 22.201* or permission.

Day or Evening Division: 1968-69 (two hours a week, *both* terms).

H.-H. Schmidt

German 22.302*, Advanced Composition

Flexibility in the use of German; composition and exercises.
Prerequisite: German 22.202* or permission.
Day or Evening Division: 1968-69 (two hours a week, *both* terms).
Lecturer to be announced

German 22.312, German Prose; Stylistics and Composition

Analysis of selected prose with practical exercises in prose writing. Elements of period style in the prose of Romanticism; elements of personal style in writings of Kleist, Keller, Mann, Rilke.
Text: H. Brinkmann, *Die deutsche Sprache.*
Day Division: 1968-69 (three hours a week).
Jutta Goheen

German 22.370, German Literature of the Nineteenth Century

An examination of the literature of "Biedermeierzeit" and Poetic Realism.
Evening Division: 1968-69 (three hours a week).
R. D. Gould

German 22.410*, History of the German Language I

The formation and early periods of the German language will be discussed in the light of the nature, specific forms and implications of phonetic change, cultural development and literary sources.
Texts: E. H. Sturtevant, *Linguistic Change.*
H. Eggers, *Deutsche Sprachgeschichte* I & II.
Day Division: 1968-69 (seminar three hours a week, first term).
Jutta Goheen

German 22.411*, History of the German Language II

The development of New High German from Luther to the twentieth century: vocabulary and stylistic trends in literature.
Text: A. Bach, *Geschichte der deutschen Sprache.*
Day Division: 1968-69 (lectures and discussion groups three hours a week, second term).
Jutta Goheen

German 22.430, Medieval Language and Literature

Detailed linguistic and stylistic examination of representative examples of Minnesang and of the popular and courtly epic.
Not offered, 1968-69.

German 22.451*, Goethe's writings: 1812-1832 (I),

German 22.452*, Goethe's writings: 1812-1832 (II)

The principal objects of detailed examination will be *Wilhelm Meisters Wanderjahre, West-Östlicher Divan* and *Faust II.* Goethe's critical, scientific and occasional writings of the period will also be considered.
Not offered, 1968-69.

German 22.460, Romanticism

The intellectual and cultural foundations of German Romanticism and its principal literary manifestations in the lyric, the drama and the novel.
Prerequisite: German 22.250 or permission.
Not offered, 1968-69.

German 22.490*, Tutorial on selected topic

Primarily for honours students in their final year. A genre, an author or a group of authors will be selected; methods of literary criticism are considered.
Day Division: 1968-69 (hours to be arranged).
Members of the Department

German 22.491, Tutorial

As above, but offered for full-course credit with a corresponding enlargement of scope and assignments.

German 22.499, Honours Essay

An option for final-year honours students.

German 22.561*, Heinrich v. Kleist

Day or Evening Division: 1968-69 (three hours a week, first term).
E. M. Oppenheimer

German 22.580, Twentieth Century Studies

Stylistic, intellectual and formal trends, as exemplified by Kaiser, Brecht, Rilke, Th. Mann and Grass.
Prerequisite: German 22.280, or equivalent.
Not offered, 1968-69.

German 22.581*, Myth in Drama: Wagner, Hofmannsthal, Hauptmann

Day or Evening Division: 1968-69 (three hours a week, second term).
E. M. Oppenheimer

German 22.590, Special Topic

German 22.599, M.A. Thesis (and colloquium)

Attention is directed to the Comparative Literature program, (p. 70).

*An asterisk attached to a course number indicates a half course.

History

Professor; Chairman
of the Department   Stanley R. Mealing
Professors   Gordon S. Couse, David M. L. Farr, Richard G. Glover,
H. Blair Neatby, Fernand Ouellet, Michael J. Sydenham
Associate Professors   John G. Bellamy, Karel D. Bicha, Desmond G. Bowen,
G. Peter Browne (on leave of absence, 1968-69),
Michael G. Fry, Peter J. King, Vaclav Mudroch,
John W. Strong
Assistant Professors   Marilyn J. Barber, B. Carman Bickerton,
Richard T. Clippingdale, J. Nicoll Cooper,
R. Carter Elwood, Robert B. Goheen,
Noami E. S. Griffiths (on leave of absence, 1968-69),
T. Murray Hunter, Roger E. Reynolds,
Norman M. Willis
Sessional Lecturers   Clifford S. Berschneider, Jaroslav A. Boucek,
Richard J. Diubaldo, Donald J. Goodspeed,
Foster J. K. Griezic, Ira D. Richards
Research Adviser   Sydney F. Wise

Major in History (Three Years)

The course pattern of all students majoring in History must be approved each year
by a member of the Department before registration is completed.

Students majoring in History are to take seven History courses, as follows:

a) one course in the first year, preferably History 24.112 or 24.115;

b) four courses, two from each of any two of the following groups:

    i) Europe to 1715: History 24.200 or 24.201, 24.211, 24.215, 24.257;

    ii) Europe since 1715: History 24.214, 24.260, 24.280, 24.316, 24.318, 24.360,
24.365, 24.380;

    iii) Great Britain and the Commonwealth: History 24.257, 24.353, 24.358,
24.370;

    iv) North America: History 24.230, 24.235, 24.240, 24.325, 24.348;

c) any two courses for which the prerequisites have been filled.

Courses offered by other departments may be counted as History courses, with
the approval of the History Department.

History majors may, if they receive the permission of the Department, substitute
courses numbered 400 or higher for courses listed above. Permission will not be
given to students whose History grades are lower than 71%.

Every student majoring in History must obtain a grade of 60% or better in the
History course of the first year and must thereafter maintain a 60% average standing
in History courses.

A combined major in History and another subject shall ordinarily include five
courses in History, including one in the first year. Students must consult both depart-
ments for regulations governing combined programs.

Honours in History (Four Years)

The Department offers an Honours program in the following fields: European history,
British and Commonwealth history, Canadian history, American history.

Candidates for the Honours B.A. are required to complete twenty courses beyond
Senior Matriculation or the Qualifying University year. The first year program is
that required for the Honours program in the Social Sciences (p. 52) or that required
for the Pass Arts course (p. 49), including History 24.112 or 24.115 in either case.
The whole of an honours candidate's program must be approved by the History
Department.

Candidates for Honours in History will complete *ten* courses in History, as follows:

a) in the first year, History 24.112 or 24.115;

b) three courses, including at least one numbered 400 or higher, from one of the following special fields:

    i) European (History 24.211, 24.214, 24.215, 24.260, 24.280, 24.316, 24.318, 24.360, 24.365, 24.380, 24.405* and 24.406*, 24.460, 24.480)

    ii) British and Commonwealth (History 24.257, 24.353, 24.358, 24.370, 24.456, 24.458, 24.473)

    iii) Canadian (History 24.230, 24.235, 24.325, 24.430, 24.431, 24.443)

    iv) American (History 24.235, 24.240, 24.348, 24.440, 24.443).

c) three courses approved by the Department, only one of which may fall within the candidate's special field.

d) in the fourth year, History 24.488 and either History 24.499 alone or History 24.490 together with one other course numbered 400 or higher.

If a candidate elects to present an Honours research essay (History 24.499, equivalent to two courses), the subject for study will be selected in consultation with the Department and a supervisor arranged. The candidate will be examined orally on his thesis.

If a candidate elects an oral examination in a special field (History 24.490, equivalent to one course), a supervisor will be arranged. The candidate will be examined in one of the four fields listed above.

Two senior courses must also be taken in a minor field—Economics, English, Geography, Political Science or another subject approved by the History Department.

Candidates will be required to show a proficient reading knowledge of at least one language other than English, the choice to depend upon the candidate's special field.

In determining the class of an honours candidate's degree, the Department will count the marks on all History courses, marks on 400 courses being given double weight.

For information about preparation to enter the Ontario College of Education, and the requirements for the Interim High School Assistant's Certificate, Type A, students are advised to consult the Registrar.

Combined Honours

Candidates who wish to do so may take combined Honours in History and another discipline, the general rule being that seven courses must be taken in each subject and that both departments must approve the candidate's program. Candidates intending to combine History and Political Science should take in their first year both Political Science 47.101 and History 24.112 or 24.115.

Graduate Studies

The Department offers work leading to the degree of Master of Arts in History in fields for which adequate source materials are available in Ottawa. Candidates entering the M.A. program must have an Honours degree in History or its equivalent in both content and standing. Candidates holding a Pass degree and with no further training will be considered as applying for admission to the Fourth year of the Honours B.A. in history.

For general regulations concerning admission, standing, time limitation and theses, see pp. 88-90.

M.A. candidates will undertake the following course of study:

1. History 24.588 (The Historiography of North America).
2. History 24.590 (supervised study for a field examination).

3. *Either*: History 24.599 (Thesis and seminar participation).
Or: a) History 24.530 (British North America) or History 24.533 (Canada since 1867) and
   b) a second seminar in the Department or a seminar, approved by the Department, in a related field.

Candidates will also be required to show a reading knowledge of a language other than English, the choice to depend on the field of the candidate's thesis or research.

History 24.010, Main Directions in Modern History

This course will provide a survey of the forces which since 1870 have shaped the growth of world civilization.
Day Division: Annually (three hours a week).
T. M. Hunter

History 24.100, An Introduction to Western Civilization

This course will aim at an explanation of the present Western way of life, with its problems, as the outcome of a process of civilization.
Not offered, 1968-69.

History 24.112, European Civilization in Modern Times

A survey of European history from the mid-seventeenth century to the First World War. Students who elect History as their major or honours subject are required to take either this course or History 24.115 rather than History 24.100.
Day and Evening Divisions: Annually (three hours a week).
R. G. Glover and M. J. Sydenham
Summer: 1968 *Evening Division* (five hours a week).
R. J. Diubaldo

History 24.115, Civilization during the Middle Ages

This course will discuss the development of the civilization which characterized the West from the decline of the Roman Empire until the Renaissance. Students who elect History as their major or honours subject are required to take either this course or History 24.112 rather than History 24.100.
Day Division: Annually (three hours a week).
J. G. Bellamy

History 13.200, Greece in the Ancient World

(Offered in the Department of Classics as *Classical Civilization 13.200.*)
Day Division: 1968-69 (two hours a week).
Summer: 1968 *Evening Division* (five hours a week).

History 13.201, Rome in the Ancient World

(Offered in the Department of Classics as *Classical Civilization 13.201.*)
Evening Division: 1968-69 (two hours a week).

History 24.211, Cultural and Intellectual History of the Middle Ages

Commencing with a study of patristic thought and institutions, this course will examine the intellectual and cultural development of medieval Europe.
Prerequisite: History 24.100 or 24.112 or 24.115 or permission of the Department.
Day Division: 1968-69 (three hours a week).
R. E. Reynolds

History 24.214, Church, State and Society from the Reformation to the Present

A study of Christian thought and institutions and their influence on the appearance of nation states and on the growth of modern pluralistic society in Europe and America. (This course is also listed as *Religion 24.214*).
Prerequisite: History 24.100 or 24.112 or 24.115 or permission of the Department.
Evening Division: 1968-69 (three hours a week).
D. G. Bowen

History 24.215, Western Europe from the Renaissance to the Eighteenth Century

A consideration of aspects of Western European development in the early modern period.
Prerequisite: History 24.115 or permission of the Department.
Day Division: Annually (three hours a week).
R. B. Goheen
Summer: 1968 *Day Division*: (ten hours a week).
C. S. Berschneider

History 43.225, Economic History

(Offered in the Department of Economics as *Economics 43.225*).
Day Division: 1968-69 (three hours a week).

History 24.230, Canada from 1791

The political, economic and social development of the British North American colonies of 1791 to the Canada of today.
Prerequisite: Permission of the Department.
Day and Evening Divisions: Annually (three hours a week).
R. T. Clippingdale, H. B. Neatby and F. Ouellet
Summer: 1968 *Day Division* (ten hours a week).
F. J. K. Griezic

History 24.231, History of Canada

The history of Canada from the development of New France to the mid-twentieth century. This course is intended for students not majoring in History. It may not be taken for credit in addition to History 24.230.
Prerequisite: Permission of the Department.
Not offered, 1968-69.

History 24.235, History of North America in the Colonial Period

An introduction to the history of Canada and the United States. The development of the Spanish, British, and French empires in North America will be considered.
Prerequisite: Permission of the Department.
Day Division: Annually (three hours a week).
B. C. Bickerton and S. R. Mealing

History 24.240, History of the United States of America

This course will consider the history of the United States in the national period, emphasizing political and economic factors.
Prerequisite: Permission of the Department.
Day Division: Annually (three hours a week).
K. D. Bicha and P. J. King
Summer: 1968 *Day Division* (ten hours a week).
I. D. Richards

History 24.257, The Tudors and Stuarts, 1485-1714

A survey of English development under two dynasties.
Prerequisite: History 24.115 or permission of the Department.
Day Division: 1968-69 (three hours a week).
R. B. Goheen

History 24.260, History of Russia and the U.S.S.R.

A survey of Russian history from Kiev to the present, with emphasis on the period since the reign of Peter the Great.
Prerequisite: History 24.100 or 24.112 or 24.115, or permission of the Department.
Day Division: 1968-69 (three hours a week).
R. C. Elwood

History 24.280, Diplomacy of the Great Powers, 1789-1890

A study of international relations from the beginning of the French Revolution to the fall of Bismarck.
Prerequisite: History 24.100 or 24.112 or 24.115, or permission of the Department.
Day Division: 1968-69 (three hours a week).
T. M. Hunter

History 24.316, France in Modern Times

An examination of elements of French history from the opening of the seventeenth century to the present.
Prerequisite: History 24.100 or 24.112 or 24.115, or permission of the Department.
Day Division: 1968-69 (three hours a week).
M. J. Sydenham

History 24.318, The German World in Modern Times

An account of German history in the nineteenth and twentieth centuries.
Prerequisite: History 24.100 or 24.112 or 24.115, or permission of the Department.
Day Division: 1968-69 (three hours a week).
N. M. Willis

History 43.325, The Economic Development of Canada

(Offered in the Department of Economics as *Economics 43.325*).
Day Division: 1968-69 (three hours a week).

History 24.345, American Economic History

An examination of the major aspects of American economic history from the colonial period to the twentieth century.
Prerequisite: History 24.240 or permission of the Department.
Not offered, 1968-69.

History 24.348, American Intellectual History

An examination of American thought from the colonial period to the twentieth century, with emphasis on political, social and religious ideas and their relation to American society and institutions.
Prerequisite: History 24.240 or permission of the Department.
Day Division: 1968-69 (three hours a week).
P. J. King

History 24.350, British Constitutional History

A survey of the development of the British constitution from its Anglo-Saxon beginnings.
Prerequisite: Permission of the Department.
Not offered, 1968-69.

History 24.353, English Social History

A survey of the development of social groups, social thought and forms of social action, mainly in the period after the Reformation.
Prerequisite: History 24.100 or 24.112 or 24.115, or permission of the Department.
Day Division: 1968-69 (three hours a week).
J. N. Cooper

History 24.358, British History from 1714

This course will centre on the political and social development of Great Britain in the nineteenth century.
Prerequisite: History 24.100 or 24.112 or 24.115, or permission of the Department.
Day Division: 1968-69 (three hours a week).
R. G. Glover

History 24.360, History of the U.S.S.R.

A political and intellectual history of Soviet Russia from 1917 to present.
Prerequisite: History 24.260 or permission of the Department.
Evening Division: 1968-69 (three hours a week).
J. W. Strong

History 24.365, History of Eastern Europe

A survey of Eastern European history from the early eighteenth century to the present with emphasis on the histories of Poland, Czechoslovakia and Hungary.
Prerequisite: Permission of the Department.
Evening Division: 1968-69 (three hours a week).
J. A. Boucek

History 24.370, British Expansion Overseas and the British Empire

This course will consider the development of the British Empire and Commonwealth from the American Revolution to the present day.
Prerequisite: Permission of the Department.
Not offered, 1968-69.

History 24.380, Diplomacy of the Great Powers, 1890-1945

The relations of the great powers in the years before 1916; wartime diplomacy and the peacemaking of 1919-23; inter-war diplomacy and the origins of the Second World War; and the relations of the powers 1939-45.
Prerequisite: Permission of the Department.
Evening Division: 1968-69 (three hours a week).
M. G. Fry and D. J. Goodspeed

History 24.385, Modern History of the Far East

A political and intellectual history of East Asia in the nineteenth and twentieth centuries, with emphasis on China and Japan.
Prerequisite: Permission of the Department.
Day Division: 1968-69 (three hours a week).
Summer: 1968 *Day Division* (ten hours a week).
J. W. Strong

History 24.405*, Medieval Institutions—Selected Problems

A seminar on topics such as the medieval papacy, heresy, manorialism, rise of the towns, forms of commerce, political theory, law, popular uprisings, and historical literature.
Prerequisite: Permission of the Department.
Not offered, 1968-69.

History 24.406*, Selected Problems in the History of Modern Institutions

A seminar which will pay particular attention to the emergence of the state during the seventeenth century and to the relation between the ideas of political thinkers and their own era.
Prerequisite: Permission of the Department.
Not offered, 1968-69.

History 13.429, Selected Problems in Greek and Roman History

(Offered in the Department of Classics as *Classical Civilization 13.429*).
Not offered, 1968-69.

History 24.430, Selected Problems in Canadian History

A seminar, primarily for students in Honours History.
Prerequisite: Permission of the Department.
Day Division: 1968-69 (three hours a week).
Marilyn J. Barber, F. Ouellet and S. R. Mealing

History 24.431, New France

A seminar, primarily for Honours students, in which selected topics in French colonial policy and the development of New France will be examined.
Prerequisite: Permission of the Department.
Day Division: 1968-69 (three hours a week).
B. C. Bickerton

History 24.440, Selected Problems in American History

A seminar, primarily for Honours students, in which selected topics in the history of the United States during the nineteenth and twentieth centuries will be considered.
Prerequisite: Permission of the Department.
Day Division: 1968-69 (three hours a week).
K. D. Bicha

History 24.443, Canada-United States Relations

A seminar which will trace the development of Canadian-American relations from the end of the eighteenth century, with particular attention to the period since 1871.
Prerequisite: Permission of the Department.
Day Division: 1968-69 (three hours a week).
D. M. L. Farr

History 24.456, Medieval Britain

A seminar on the development of medieval English institutions from the Anglo-Saxon invasions.
Prerequisite: Permission of the Department.
Day Division: 1968-69 (three hours a week).
J. G. Bellamy

History 24.458, Selected Problems in Nineteenth-Century British History

A seminar which will examine certain problems in nineteenth-century British society, politics, and religion in the light of existing sources.
Prerequisite: Permission of the Department.
Day Division: 1968-69 (three hours a week).
J. N. Cooper

History 24.460, Selected Problems in Russian and Soviet History

Extensive reading and research in a selected problem from the history of Russia.
Prerequisite: Permission of the Department.
Day Division: 1968-69 (three hours a week).
R. C. Elwood

History 24.473, The British Commonwealth of Nations

A seminar on the history, structure and role of the Commonwealth in the twentieth century.
Prerequisite: Permission of the Department.
Not offered, 1968-69.

History 24.480, Selected Problems in Twentieth-Century Diplomatic History

A seminar, primarily for students in Honours History.
Prerequisite: Permission of the Department.
Day Division: 1968-69 (three hours a week).
M. G. Fry

History 24.488, The Philosophy of History

A seminar in which major historical writings and works in the philosophy of history will be examined.
Prerequisite: Permission of the Department.
Day Division: Annually (three hours a week).
G. S. Couse

History 24.490, Honours Tutorial

Supervised study in a special field, in preparation for an oral examination.
Prerequisite: Permission of the Department.
Day Division: Annually (tutorial hours arranged).
Members of the Department

History 24.499, Honours Research Essay

Open to candidates for Honours in History in their fourth year. The subject for research will be settled in consultation with the Department and a supervisor will be assigned. The candidate will be orally examined upon his essay after presentation.
Day Division: Annually (tutorial hours arranged)
Members of the Department

History 24.530, The Social and Economic History of the Canadas, 1784-1850

A seminar primarily for graduate students in History. Assignments will be required, together with a written examination.
Evening Division: 1968-69 (three hours a week).
F. Ouellet and S. F. Wise

History 24.533, Post-Confederation Canada

A seminar primarily for graduate students in History. Assignments will be required, together with a written examination.
Day and Evening Divisions: 1968-69 (three hours a week).
R. T. Clippingdale and H. B. Neatby

History 24.588, The Historiography of North America

A course, primarily for graduate students in History, in which the trends and methods of historical writing in North America will be examined.
Evening Division: 1968-69 (three hours a week).
P. J. King and S. R. Mealing

History 24.590, Tutorial—Graduate Studies

Supervised study in a specified field, in preparation for a written examination.
Day and Evening Divisions: Annually (tutorial hours arranged).
Members of the Department

History 24.599, Thesis—Graduate Studies

A substantial historical investigation. The subject will be settled in consultation with the Department and a supervisor will be assigned. The candidate will be orally examined after presenting his thesis.
Day and Evening Divisions: Annually (tutorial hours arranged).
Members of the Department

Italian

Associate Professor;
Chairman of the
Department   C. A. Marsden
Lecturer   Claudia Persi

Since 1966-67 a limited range of courses has been offered in Italian. The program will be expanded as the need is manifested.

Italian 26.015, Introduction to Italian

A beginning course designed to give the student the fundamentals of written and spoken Italian. Grammar, reading and oral practice. Attendance at both classes and laboratory sessions is compulsory.
Text: Speroni and Golino, *Basic Italian.*
Day Division: 1968-69 (lectures and laboratory four hours a week).

Italian 26.100, Intermediate Italian

A course intended to consolidate and supplement knowledge of the language and culture acquired in Italian 26.015. Reading of literary texts, composition and oral practice.
Text: To be announced.
Prerequisite: Italian 26.015 or equivalent.
Evening Division: 1968-69 (three hours per week).

Italian 26.230, Modern Italian Literature

A survey of Italian Literature from Manzoni to the present day.
Prerequisite: Italian 26.100 or permission of the Department.
Text: To be announced.
Day Division: 1968-69 (lectures three hours a week).

Journalism

Professor Emeritus	Wilfrid Eggleston
Associate Professor; Director of the School	T. Joseph Scanlon
Associate Professor	Wilfred H. Kesterton
Assistant Professors	Stuart Adam, Joel Weiner, Phyllis Wilson
Special Lecturers	William Drinkwater, Melville W. Thistle
Sessional Lecturers	Don Peacock, Bob Prinsky, Joan Topolski, Bruce Yemen
Seminar Leaders	Hal Anthony, Nathan Dreskin, Jean-Louis Gagnon, Walter B. Herbert, Wilson Southam, Helen Wilson
Field Work Supervisors	Ernie Calcutt (*CFRA*), John McLeod (*Ottawa Journal*), Burns Stewart (*Canadian Broadcasting Corporation*), Fred Johnstone (*Ottawa Citizen*), Fraser MacDougall (*Canadian Press*)

Journalism 28.210, Introduction to Journalism

A broad survey of the whole field. Opportunities and personal requirements in various branches of the media. A history of journalism, emphasizing as major themes: technological developments, the growth of press freedom and press responsibility, studies of representative journals and journalists, mainly Canadian, British and American. The mass media today.
Text: Kesterton, *A History of Journalism in Canada*.
Recommended Reading: Siebert, Peterson and Schramm, *Four Theories of the Press*. Emery, Ault and Agee, *An Introduction to Mass Communications*.
Day Division: Annually (lectures and practical exercises, four hours a week).
Siuart Adam, Joel Weiner
Summer: 1968 *Day Division* (lectures ten hours a week).
Stuart Adam

Journalism 28.220, Fundamentals of Reporting

The nature of news values; how to recognize and collect news; how to analyze, organize and report it. Interviewing and news gathering. This is mainly a practical course, based on assignments in reporting and other forms of writing.
Text: MacDougall, *Interpretative Reporting*.
Day Division: Annually (lectures and practical exercises, four hours a week).
Bob Prinsky, T. J. Scanlon, Joan Topolski, and Bruce Yemen
Summer: 1968 *Evening Division* (lectures and assignments averaging seven hours a week).
Don Peacock, Bob Prinsky

Journalism 28.330, Editing

Copy-reading and head-writing. This course will provide practical instruction in the duties and responsibilities of the deskman, and training in reading copy and writing headlines; the use of illustrations. The responsibilities and opportunities of the editor in his community will be discussed; problems of management; personnel relations; the press and society; semantics; the ethics of journalism; freedom of the press; the law and the press; censorship in war and peace; news policy, the sources and interpretation of foreign news.
Text: Bastian, Case, and Baskette, *Editing the Day's News*.
Prerequisite: Journalism 28.210.
Day Division: Annually (lectures three hours a week).
W. H. Kesterton

Journalism 28.340, Interpretative Journalism

This is mainly a practical course based on community assignments aimed at identifying and interpreting the news. Coverage extends to politics and governmental activity, both civic and federal, and to the specialized fields of international affairs, business, labor, science, sports, the drama, film, music, art and book review. The course includes development of contacts and sources, methods of research, use of a newspaper library and morgue; and work in Ottawa newsrooms.
Text: MacDougall, *Interpretative Reporting*.
Prerequisite: Journalism 28.220.
Day Division: Annually (lectures and practical exercises averaging six or seven hours a week).
Phyllis Wilson

Journalism 28.350, Career Seminar in Journalism

Round table discussions with guest speakers. Each student in Journalism 28.350 will be required to choose a current topic of Canadian interest for extensive live research and study as preparation for an oral report, which will be followed by questioning from instructor and group. Vocational guidance. Groups will be arranged whenever possible to meet the needs of those who have special interests or ambitions.
Prerequisite: For final year Journalism students.
Day Division: Annually (round table sessions, two hours a week, plus special seminars).
Joel Weiner, Phyllis Wilson

Journalism 28.410, The Press in Modern Society

A brief historical survey of the rise of the press as an influential agency in western society is followed by a more detailed examination of the ownership and control of the press today, and the consequences and implications. Theories of the press. Public opinion. Propaganda. Freedom of the press in Canada and around the world.
Recommended Reading: Peterson, Jensen, Rivers, *Mass Media and Modern Society*. Kesterton, *A History of Journalism in Canada*.
Prerequisite: For students enrolled in the one-year graduate course.
Day Division: Annually (lectures, discussions and projects averaging three hours a week).
W. H. Kesterton

Journalism 28.430, Editorial Practice and Policy

Editing and the tasks and roles of the editor. Some practical work in copyreading and headline writing. The use of typography and illustrations. The responsibilities and opportunities of the editor and publisher. Editorial writing. The law of the press. The ethics of the press. Censorship. Sources of foreign news. Copyright. Publishing problems.
Text: Bastian, Case and Baskette, *Editing the Day's News*.
Recommended Reading: Schmeiser, *Civil Liberties In Canada*.
Prerequisite: For students enrolled in the one-year graduate course.
Day Division: Annually (lectures and practical exercises, three hours a week).
W. Eggleston and W. H. Kesterton

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Journalism 28.440, Modern News Reporting

The theory and practice of covering the news of the day in all the media. This course includes a series of practical reporting exercises of a realistic and increasingly complex nature. Reporting "in depth". Coverage of public affairs, and other specialized areas of human activity. Students in this course will be given opportunity to work in Ottawa newsrooms if they lack practical background.

Texts: MacDougall, *Interpretative Reporting;*
Copple, *Depth Reporting.*
Prerequisite: For students enrolled in the one-year graduate course.
Day Division: Annually (workshops and practical exercises averaging eight to nine hours a week).
T. J. Scanlon

Journalism 28.460, Public Issues and Problems

A series of seminars and round table discussions will be held on a number of the leading news topics of the day. Stress will be placed on those perennial problems certain to crop up in the years ahead. Each student will be responsible for lengthy investigations and reporting of one or more of these current issues.

Prerequisite: For students enrolled in the one-year graduate course.
Day Division: Annually (seminars of two hours a week and practical projects of varying length).
Stuart Adam, Joel Weiner

Journalism 28.490, Honours Tutorial

This will be primarily a reading and research course in which students will attempt to deepen their knowledge about the various fields of journalism by reading, research and by the presentation of seminar papers. Students in this course will be given the opportunity to prepare and direct assignments given to other students.

Texts: MacDougall, *Interpretative Reporting.*
Klapper, *The Effects of Mass Communication.*
Prerequisite: For Honours students only.
Day Division: Annually.
T. J. Scanlon

Journalism 28.498, Honours Research

This is a thesis course. Students in this course will have to carry out directed research and prepare a thesis under the supervision of one faculty member.
Prerequisite: For Honours students only.
Day Division: Annually.
Members of the Department

Mathematics

Professor; Chairman of the Department	R. L. Rosenberg
Professors	P. R. Beesack, D. K. Dale, M. S. Macphail, P. Mandl, F. H. Northover, D. W. Sida
Associate Professors	J. D. Dixon, C. W. L. Garner, J. E. Graham, L. D. Nel, B. M. Puttaswamaiah, E. Saleh, Helga H. Schirmer, R. J. Semple, K. S. Williams
Assistant Professors	K. Hardy, Marianne Helfenstein, A. B. M. L. Kabir, M. J. Moore, E. J. Norminton, J. N. Pandey, J. C. Poland, M. Rahman, J. H. Thompson, G. Zelmer
Lecturers	D. Jacobson, Marion J. Watson

Course Numbering: Course numbers prefixed by 70. indicate courses intended for honours students; all other courses have numbers prefixed by 69. *Credit will not be given for both of two courses having the same number but different prefixes.*

First Year: Students entering First year who plan to take a Major or Honours in Mathematics should obtain the advice of the Department as to their choice of courses.

Major in Mathematics

1. *Requirements for B.Sc.*
(a) Successful completion of first year with a grade of 60% or better in two courses, one of which must be in Mathematics 69.100[1].
(b) The following Mathematics courses:

Second Year	Third Year
69.205*	(i) the equivalent of two full courses from 69.307*, 69.308*,
69.215*	69.310, 69.325*, 69.326*, 69.335*, 69.341, 69.350
69.245*	(ii) the equivalent of one full course in the range 69.307* to
69.257*	69.360

(c) Two courses from one Science[2] department other than Mathematics (three if one was not taken in the first year) and two courses from the Faculty of Arts.
(d) One optional course which may be in Mathematics.

2. *Requirements for B.A.*
(a) Successful completion of first year with a grade of 60% or better in Mathematics 69.100.[1]
(b) The following Mathematics courses:

Second Year	Third Year
69.205*	(i) the equivalent of two full courses from 69.307*, 69.308*,
69.215*	69.310, 69.325*, 69.326*, 69.335*, 69.341, 69.350
69.245*	(ii) the equivalent of one full course in the range 69.307* to
69.257*	69.360

(c) Two courses from one Arts department other than Mathematics (three if one was not taken in the first year) and one of Biology 61.100, Chemistry 65.010, 65.100 or 65.105, Geology 67.100 or Physics 75.010, 75.100 or 75.105.
(d) Two optional courses one or both of which may be in Mathematics.

[1] With satisfactory standing in his course program and a grade of 70% or better in Mathematics 69.101, a student may be permitted by the Department to major in Mathematics after the completion of additional readings in Mathematics.
[2] The following Psychology courses also will be accepted as continuation courses from a Science department: Psychology 49.220*, 49.221*, 49.270, 49.305, 49.320, 49.335.

3. *Requirements for a combined Major in Arts*:
In general, the requirements will be the same as those in section 2 above except that the equivalent of only one full course in 2(b)(i) will be required instead of two. All such programs must be arranged in consultation with the Mathematics Department.
4. Of the total fifteen courses at least eight must be numbered 200 or higher.
5. All course selections must be approved by the Mathematics Department.
6. In certain cases, with the permission of the department, the courses listed in 1(b) and 2(b) above may be replaced by corresponding honours courses, that is, courses having the number prefix 70.

Honours in Mathematics

1. *Requirements for Honours B.A. or B.Sc.*
(a) Successful completion of first year with a grade of at least 60% in Mathematics 69.100[1] and 58% overall in the first year.
(b) At least the following mathematics courses:

Second Year	Third and Fourth Years
70.200	70.300
70.210	70.307*
70.245*	70.310
70.257*	70.495*

    (i) the equivalent of one and a half courses at the 400 level
    (ii) the equivalent of one and a half courses selected from 70.309*, 69.325*, 69.326*, 70.327*, 70.341, 70.350, 69.357*, 69.358*, and all courses at the 400 level

It is strongly recommended that 70.300 be taken in the third year.
(c) Six additional courses at least four of which are numbered 200 or higher, and which may be in mathematics provided that: for the B.Sc., of these six courses, at least two must be in one Science[2] department other than Mathematics (three if one was not taken in the first year) and at least two must be from the Faculty of Arts; for the B.A., of these six courses, at least two must be in one Arts department other than Mathematics (three if one was not taken in the first year).
2. All course selections must be approved by the Mathematics Department.
3. The B.Sc. candidate must pass a reading knowledge examination in one of French, German or Russian.
4. Mathematics 70.495* is the Honours Project in Mathematics. It consists of a written report on some approved topic or topics in the field of mathematics together with a short lecture on the report. Each student must commence work on his project under a faculty supervisor before June 1 of his third academic year. No student may register in his fourth year without having commenced work on his project under a faculty supervisor.
The first draft of this report is to be submitted to a supervisor by November 1, and the final draft to the department by January 15. Students who do not meet this latter deadline are deemed to have failed the course, and must repeat it in the following academic year.

[1]With satisfactory standing in his course program and a grade of 70% or better in Mathematics 69.101, a student may be permitted by the Department to major in Mathematics after the completion of additional readings in Mathematics.
[2]The following Psychology courses also will be accepted as continuation courses from a Science department: Psychology 49.220*, 49.221*, 49.270, 49.305, 49.320, 49.335.

Combined Honours in Mathematics and Physics

1. *Requirements for Combined Honours B.Sc.*

(a) Successful completion of first year with a grade of at least 60% in each of Mathematics 69.100[1] and Physics 75.100[1], and 58% overall in the First year.

(b) The following eighteen courses:

Second Year
Mathematics 70.200
Mathematics 70.210
Mathematics 70.245*
Mathematics 70.257*
Physics 75.211*
Physics 75.231*
Physics 75.222*
Physics 75.242*
One course from the
Faculty of Arts

Third Year
Mathematics 70.300
Mathematics 70.307*
Mathematics 70.309*
Mathematics 70.310
Mathematics 70.341
Physics 75.307*
Physics 75.317*
Physics 75.341*
Physics 75.360

Fourth Year
One Mathematics course at the 400 level
Physics 75.407*
Physics 75.437*
Physics 75.447*
Physics 75.476
Physics 75.499 or Mathematics 70.495* and another half course in Mathematics at the 400 level
One course in Mathematics or Physics

2. The requirements specified in sections 2, 3, 4, under Honours in Mathematics must be satisfied.

3. During the Fourth year, comprehensive examinations are given.

[1]With satisfactory standing in his course program and a grade of 70% or better in Mathematics 69.101 and/or Physics 75.105, a student may be permitted by both departments to take combined Honours in Mathematics and Physics after the completion of additional readings.

Combined Honours in Economics and Mathematics

1. Students will have a choice of a combination of Economics and Pure Mathematics or Economics and Statistics. In either case the requirements will be:

(a) At least seven courses in Economics to include Economics 43.100, 43.200, 43.210, 43.225 or 43.325, 43.400 or 43.492, 43.498 and one other in category four.

(b) At least eight courses in Mathematics to include:

In the first two years
Mathematics 69.100[1], 70.200, 70.210, 70.257*.

In the final two years
Mathematics 70.245*, 70.300, 70.307*, 70.310, and one and one half other mathematics courses, at least one of which is at the 400 level,

<div align="center">OR</div>

Mathematics 70.350, 69.357*, 69.358* and two and one half other mathematics courses, at least one of which is at the 400 level.

[1]With satisfactory standing in his course program and a grade of 70% or better in Mathematics 69.101, a student may be permitted by the department to major in Mathematics after the completion of additional readings in Mathematics.

2. The requirements for comprehensive examinations in both departments must be satisfied.

3. Each year's program must be determined in consultation with the two departments.

Requirements for Graduate Degrees

Master of Science

1. For admission to the degree program, candidates must have the equivalent of an Honours degree in mathematics with at least second class honours standing. Candidates with a Pass degree may, with the permission of the department, be admitted to a qualifying year to attain the above requirement. Candidates are required to write the Advanced Tests in Mathematics of the Graduate Record Examinations.

2. The course requirements are:

a) three or four courses and a suitable thesis or

b) five courses, without a thesis.

All courses must be selected from the 400 and 500 series and at least half of them must be in the 500 series.

3. The candidate will be required to give satisfactory evidence of his ability to read mathematical literature in one of French, German, or Russian.

4. Each candidate will be required to take a comprehensive examination covering appropriate fields in mathematics and a final oral examination on the subject of his thesis and related fields.

Doctor of Philosophy

1. For admission to the degree program, candidates must have the equivalent of a Master's degree in mathematics.

2. The course requirements are a minimum of three courses in the 500 series and a suitable thesis.

3. The candidate will be required to give satisfactory evidence of his ability to read mathematical literature in two languages (other than English) as specified by the Department.

4. Each candidate will be required to take a comprehensive examination covering appropriate fields in mathematics and a final oral examination on the subject of his thesis and related fields.

All graduate programs must meet the approval of the department.

Mathematics 69.010, Introductory Analysis

Logical reasoning, function as a mapping, second degree relations in the plane, trigonometry, transformations in the plane, slopes and simple derivatives; applications of differentiations.
Day Division: Annually (lectures three hours a week).
Evening Division: Annually (lectures three hours a week).

Mathematics 69.011, Introductory Algebra

Sets, subsets, and permutations; mathematical induction and the binomial theorem; probability; vectors; equations of lines and planes; systems of linear equations; matrices and linear transformations; complex numbers and polar coordinates.
Prerequisite: Taken concurrently with Mathematics 69.010.
Day Division: Annually (lectures three hours a week).
Evening Division: Annually (lectures three hours a week).

Mathematics 69.100, Introductory Calculus and Algebra

Functions, limits and derivatives, differentiation of algebraic functions, applications, the definite integral, special functions, formal integration, approximations, Taylor's theorem with remainder. Sets, number systems, matrix algebra, vector geometry, vector functions.
Prerequisites: Mathematics 69.010 and 69.011 (Grade 13 Mathematics A and B).
Day Division: Annually (lectures four hours a week, one hour tutorial).
Evening Division: Annually (lectures four hours a week, one hour tutorial).

Mathematics 69.101, Introductory Mathematics

Inequalities, absolute values, integrals, relations, functions, limits of functions, continuity, derivatives, antiderivatives, definite integrals, fundamental theorem of calculus, improper integrals. Linear algebra: vectors, matrices, determinants, inverse matrix, systems of linear equations, linear programming.
Prerequisite: Mathematics 69.010 (at least algebra and trigonometry) or Grade 13 Mathematics A.
Day Division: Annually (lectures four hours a week).
Evening Division: Annually (lectures four hours a week).

Mathematics 69.130, General Mathematics

Deductive nature of mathematics; the axiomatic method; selected topics, such as probability; introduction to calculus, matrix algebra, topology.
Day Division: Annually (lectures three hours a week).

Mathematics 69.135*, Algebra and Geometry

Sets, Boolean algebra, vector geometry, spherical trigonometry.
Prerequisite: Engineering students, first year.
Day Division: Annually (lectures one hour a week, both terms).

Mathematics 70.200, Intermediate Calculus

Real numbers, sequences, infinite series of real or complex constants, limits and continuity, functions of several variables, definite, multiple, line integrals, infinite series of functions.
Prerequisite: Mathematics 69.100.[1] (Honours Students).
Day Division: Annually (lectures three hours a week).

Mathematics 69.201, Intermediate Calculus and Algebra

Differential calculus of functions of several variables, multiple integration, elements of infinite series, linear algebra, differential equations.
Prerequisite: Mathematics 69.100 or 69.101.
Day Division: Annually (lectures four hour a week).

Mathematics 69.205*, Intermediate Calculus

Review of three dimensional analytic geometry, partial differentiation, infinite series, indeterminate forms, l'Hospital's rule, multiple integration, implicit functions, transformations, Jacobians. (Half course).
Prerequisite: Mathematics 69.100.[1]
Day Division: Annually (lectures four hours a week, first term).
Evening Division: Annually (lectures four hours a week, first term).

Mathematics 70.210, Linear Algebra

Set theory, algebraic systems, vector spaces, inner product spaces, linear transformations, determinants, quadratic forms, selected applications.
Prerequisite: Mathematics 69.100 (Honours students).
Day Division: Annually (lectures three hours a week).

Mathematics 69.215*, Linear Algebra

An introduction to vector spaces; theory of linear transformations and matrices; applications. (Half course).
Prerequisite: Mathematics 69.100 or 69.101.
Day Division: Annually (lectures two hours a week, both terms).
Evening Division: Annually (lectures two hours a week, both terms).

Mathematics 69.245*, Introduction to Applied Mathematics

Ordinary differential equations of first and second order, introduction to classical mechanics in one and two dimensions. (Half course).
Prerequisite: Mathematics 69.100.
Day Division: Annually (lectures four hours a week, second term).
Evening Division: Annually (lectures four hours a week, second term).

Mathematics 70.245*, Introduction to Applied Mathematics

An introduction to the dynamics of a particle and of a rigid body in one and two dimensions. (Half course).
Prerequisite: Mathematics 69.100 (Honours students).
Day Division: Annually (lectures two hours a week, both terms).

Mathematics 69.250, Introduction to Statistical Analysis

Frequency distributions; moments; measures of central tendency, dispersion, skewness; probability; distributions, Binomial, Poisson, Normal, z, t, F, χ^2; statistical inference, confidence intervals; experimental designs, randomized block, Latin square; enumeration statistics; least squares analysis, introduction to correlation and regression analysis; non-parametric tests.
Prerequisites: Mathematics 69.010 and 69.011 (non-mathematics students).
Day Division: Annually (lectures three hours a week, two hours laboratory).
Evening Division: Annually (lectures three hours a week, two hours laboratory).

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[1]With satisfactory standing in his course program and a grade of at least 70% or better in Mathematics 69.101, a student may be permitted by the Department to take Mathematics 69.205* or 70.200.

Mathematics 69.257*, Introduction to Statistics

Introduction to probability, sample space; descriptive statistics, histograms, ogives, moments; density functions, analogy with discrete distributions, univariate and bivariate, binomial, Poisson, uniform, normal; confidence intervals; use of t, χ^2, F distributions, tests of hypotheses, analysis of variance: introduction to regression analysis. (Half course).
Prerequisite: Mathematics 69.100 or 69.101.
Day Division: Annually (lectures two hours a week, both terms, plus laboratory).
Evening Division: Annually (lectures two hours a week, both terms, plus laboratory).

Mathematics 70.257*, Introduction to Statistics

Introduction to probability, sample space; descriptive statistics, histograms, ogives, moments; density functions, analogy with discrete distributions, univariate and bivariate, binomial, Poisson, uniform, normal; confidence intervals; use of t, χ^2, F distributions, tests of hypotheses, analysis of variance: introduction to regression analysis. (Half course).
Prerequisite: Mathematics 69.100 (Honours students).
Day Division: Annually (lectures two hours a week, both terms, plus laboratory).
Evening Division: Annually (lectures two hours a week, both terms, plus laboratory).

Mathematics 70.300, Introduction to Analysis

The real number system, sequences and series, geometry and topology in Euclidean spaces, real and vector valued functions in Euclidean spaces, limits, continuity, differentiability, transformations, Riemann integrals in Euclidean spaces; improper Riemann integrals, convergence and uniform convergence of sequences and series of functions.
Prerequisites: Mathematics 70.200 and 70.210 or permission of the Department.
Day Division: Annually (lectures three hours a week).

Mathematics 69.305*, Functions of a Complex Variable

Analytic functions: contour integration: residues: conformal transformations: Laplace transform. (Half course).
Prerequisites: Mathematics 69.205* and 69.245* or 69.201 (engineering students).
Day Division: Annually (lectures three hours a week, one term).

Mathematics 69.306*, Mathematical Methods I

Series solution of ordinary differential equations: solution of partial differential equations of mathematical physics: special functions: Fourier analysis: boundary value problems. (Half course).
Prerequisites: Mathematics 69.205* and 69.245* or 69.201 (engineering students).
Day Division: Annually (lectures three hours a week, one term).

Mathematics 69.307*, Functions of a Complex Variable

Analytic functions, contour integration, residue calculus, conformal mapping. (Half course).
Prerequisites: Mathematics 69.205* and 69.245* or 69.201 (non-engineering students).
Day Division: Annually (lectures two hours a week, both terms).

Mathematics 70.307*, Functions of a Complex Variable

Analytic functions, contour integration, residue calculus, conformal mapping (Half course).
Prerequisite: Mathematics 70.200 or permission of the Department.
Day Division: Annually (lectures two hours a week, both terms).

Mathematics 69.308*, Boundary Value Problems

Differential equations; solution in series; the formulation of boundary value problems in mechanics, heat conduction, etc.; the method of separation of variables; eigen-functions and eigenvalues; Fourier series; Legendre polynomials and applications; the method of Laplace transforms. (Half course).
Prerequisites: Mathematics 69.205* and 69.245* or 69.201 (non-engineering students).
Day Division: Annually (lectures two hours a week, both terms).

Mathematics 70.308*, Theory of Ordinary Differential Equations

Picard's existence-uniqueness theorem, linear differential equations of nth order, Laplace transform techniques, solution in series, Frobenius' method, oscillation theorems. (Half course).
Prerequisites: Mathematics 70.200; 70.300, 70.307* (may be taken concurrently) or permission of the Department.
Day Division: Annually (lectures two hours a week, both terms).

Mathematics 69.310, Modern Algebra

Introduction to modern algebraic structures — semigroups, groups, rings, integral domains, fields, number systems, vector spaces and lattices.
Prerequisite: Mathematics 69.215*.
Day Division: Annually (lectures three hours a week).

Mathematics 70.310, Modern Algebra I

Introduction to modern algebraic structures — semigroups, groups, rings, integral domains, fields, number systems, vector spaces and lattices.
Prerequisite: Mathematics 70.210, or permission of the Department.
Day Division: Annually (lectures three hours a week).

Mathematics 69.325*, Advanced Euclidean Geometry

Transformations of the plane: isometries, similarities, inversion. Groups of sym-metries of plane figures and regular polyhedra. Orthogonal circles, pencils of coaxal circles. (Half course).
Prerequisite: Mathematics 69.215*.
Day Division: Annually (lectures three hours a week, second term).

Mathematics 69.326*, Plane Projective Geometry

Axioms of projective geometry, principle of duality; one-dimensional projectivities and the Fundamental theorem; collineations (homologies and elations), correlations (polarities and the conic); introduction to finite projective planes. (Half course).
Prerequisite: Mathematics 69.215*.
Day Division: Annually (lectures three hours a week, first term).

Mathematics 70.327*, Differential Geometry

Theory of curves and surfaces; geometry on a surface; mappings. (Half course).
Prerequisite: Mathematics 70.200 or permission of the Department.
Day Division: Annually (lectures three hours a week, second term).

Mathematics 69.335*, Introduction to the Theory of Numbers

Euclidean algorithm, unique factorization theorem, linear diophantine equations, congruences, Fermat and Wilson theorems, primitive roots, quadratic residues, arithmetic functions, sums of squares, Pell's equation, rational approximation to real numbers. (Half course).
Prerequisites: Mathematics 69.205*, 69.215*.
Day Division: Annually (lectures three hours a week, first term).

Mathematics 69.341, Applied Mathematics

The dynamics of a system of particles with applications to astronomy and other physical sciences. Conservation laws; planetary motion; inertial forces and accelerating coordinate systems; elementary potential theory; hydrodynamics; applications to astronomy.
Prerequisites: Mathematics 69.205*, 69.215*, 69.245*.
Day Division: Annually (lectures three hours a week).

Mathematics 70.341, Applied Mathematics

A study of the methods and techniques of applying mathematical concepts and models; with special reference to dynamics of a particle and rigid body, statics, mechanics of continuous media.
Prerequisite: Mathematics 70.200 or permission of the Department.
Day Division: Annually (lectures three hours a week).

Mathematics 69.350, Mathematical Statistics

Probability distributions for discrete and continuous random variables (univariate and bivariate); mathematical expectation and generating functions; sampling distributions; point and interval estimation; tests of hypotheses (theory and applications); introduction to non-parametric methods.
Prerequisite: Mathematics 69.257*, or 69.250 or permission of the Department.
Day Division: Annually (lectures three hours a week).

Mathematics 70.350, Statistical Theory

Probability distributions, discrete and continuous, univariate and multivariate, expected value; moment generating functions; limit theorems, law of large numbers, orthogonal linear functions, derived sampling distributions; fundamentals in estimation procedures; maximum likelihood; tests of hypotheses; power functions; applications.
Prerequisites: Mathematics 70.200, 70.210 and 70.300 (taken concurrently) or permission of the Department.
Day Division: Annually (lectures three hours a week).

Mathematics 69.357*, Experimental Designs I

Role of randomization, replication, local control; multiple range tests; linear statistical models; the theory and analysis of completely randomized, randomized block and Latin square designs; missing value techniques; subsampling designs and components of variance estimation; Graeco-Latin and Youden squares; orthogonal comparisons; switch-back designs; size of the experimental unit; transformation of observations. (Half course).
Prerequisites: Mathematics 69.100 or 69.101, 69.250 or 69.257*.
Day Division: Annually (lectures three hours a week, first term).

Mathematics 69.358*, Experimental Designs II

Factorial experiments — 2^n, 3^n, p^n series and mixed factorials; complete and partial confounding, fractional replication; the split plot design; incomplete block and lattice designs; special design situations. (Half course).
Prerequisite: Mathematics 69.357*.
Day Division: Annually (lectures three hours a week, second term).

Mathematics 69.360, Numerical Analysis

Finite differences and interpolation, systems of linear equations and matrix inversion, difference equations, error analysis, eigen-value problems, relaxation methods.
Prerequisites: Mathematics 69.205*, 69.245* and 69.215*, or 69.201 and the permission of the Department.
Evening Division: 1968-69 (lectures two hours a week, laboratory three hours a week).

A selection from the following courses in the 400 series will be offered if there is sufficient demand.

Mathematics 70.400, Introduction to Partial Differential Equations

First order equations and systems; second order linear equations; elements of distributions; potential theory in two dimensions; equations of motion; eigenfunctions; Green's functions; classical cylindrical and spherical problems.
Prerequisites: Mathematics 70.300, 70.308*, or permission of the Department.

Mathematics 70.404*, Introduction to Hilbert Space

Scalar product, projections, completeness, linear functionals, Riesz' theorem, bounded operators, adjoint and self-adjoint operators, completely continuous operators, unitary, isometric operators, eigenvectors, spectral analysis of completely continuous operators. (Half course).
Prerequisites: Mathematics 70.310, 70.407*, 70.423 (may be taken concurrently) or permission of the Department.

Mathematics 70.405*, Functions of a Complex Variable

General properties of analytic functions. (Half course).
Prerequisites: Mathematics 70.300 and 70.307* or permission of the Department.

Mathematics 70.406*, Special Functions

Gamma, Hypergeometric, Bessel and Legendre functions. (Half course).
Prerequisite: Mathematics 70.405* (taken concurrently) or permission of the Department.

Mathematics 70.407*, Measure Theory

Measure theory and integration of real-valued functions. (Half course).
Prerequisite: Mathematics 70.300 or permission of the Department.

Mathematics 70.408*, Asymptotic Series

Theory of asymptotic series; methods of derivation (method of steepest descents). (Half course).
Prerequisite: Mathematics 70.406* or permission of the Department.

Mathematics 69.409*, Mathematical Methods II

Uniform convergence, general theory of linear differential equations, Frobenius' method, partial differential equations. (Half course).
Prerequisites: Mathematics 69.305* and 69.306* (Engineering students).

Mathematics 70.410, Modern Algebra II

Groups, rings, modules, polynomials, extensions of rings and fields, and Galois theory.
Prerequisite: Mathematics 70.310 or permission of the Department.

Mathematics 70.420, Modern Geometry

Incidence, absolute, hyperbolic, elliptic, metric-projective geometries. Embedding of hyperbolic and Euclidean geometries in projective plane, groups of motions, models of non-Euclidean geometry.
Prerequisite: Mathematics 70.310 or permission of the Department.

Mathematics 70.423, General Topology

Basic properties of general topological spaces, maps, separation axioms, connectedness, compactness, metric spaces, homotopy, dimension theory.
Prerequisite: Mathematics 70.300 or permission of the Department.

Mathematics 70.430, Theory of Numbers

Algebraic number theory, algebraic number fields, bases, algebraic integers, integral bases, arithmetic in algebraic number fields, ideal theory. Geometric number theory, lattices, Blichfeldt's and Minkowski's theorems, distance functions, convex bodies. Analytic number theory, Dirichlet series, characters, Zeta-functions, prime number theorem, Dirichlet's theorem on primes in arithmetic progressions.
Prerequisites: Mathematics 70.307*, 70.310 or permission of the Department.

Mathematics 70.431, Introduction to Mathematical Logic

Symbolic logic, set theory, abstract algebra, propositional calculus, the predicate calculus, completeness.
Prerequisite: Permission of the Department.

Mathematics 70.445*, Analytical Dynamics

Lagrange's equations; small oscillations; rigid dynamics in three dimensions; motion of top; introduction to Hamiltonian mechanics. (Half course).
Prerequisite: Mathematics 70.341 or permission of the Department.

Mathematics 70.446*, Hydrodynamics

Two dimensional inviscid flow; vortex motion; application of conformal transformation; axi-symmetric flows. (Half course).
Prerequisites: Mathematics 70.307* and 70.341 or permission of the Department.

Mathematics 70.447*, Tensor Analysis and Relativity Theory

Development of tensor analysis, application to Riemannian spaces and relativity theory. (Half course).
Prerequisite: Mathematics 70.341 or permission of the Department.

Mathematics 70.448*, Introduction to Electromagnetic Theory

Electrostatics, Poisson and Laplace's equations, steady electric currents, dielectrics, the electro-magnetic field, magnetostatics, Maxwell's equations for bodies at rest. (Half course).
Prerequisites: Mathematics 70.341, 70.307* or permission of the Department.

Mathematics 70.451, Probability Theory

Introduction to probability, characteristic functions, probability distributions, limit theorems, stochastic processes.
Prerequisite: Mathematics 70.350 or permission of the Department.

Mathematics 70.452, Sampling: Theory and Methods

Basic concepts; simple random sampling; stratified sampling, allocation methods; multi-stage sampling; probability sampling; double sampling, sequential tests; ratio and regression estimates; selection methods.
Prerequisite: Mathematics 70.350 or permission of the Department.

Mathematics 70.453, Correlation and Regression Analysis

Linear estimators; the method of least squares; simple linear regression techniques and theory; the Markoff theorem; non-linear regression; multiple linear regression, multiple and partial correlation; covariance analysis; orthogonal polynomials, harmonic analysis, internal least squares, the modified Gauss-Newton method, discriminant analysis; introduction to the theory of the general linear hypothesis.
Prerequisite: Mathematics 70.350 or permission of the Department.

Mathematics 70.454, Operations Research

Linear programming, game theory, queue theory, inventory control systems, sequencing, dynamic programming.
Prerequisite: Mathematics 70.350 or permission of the Department.

Mathematics 70.490, Directed Special Studies

Advanced problems and readings from various mathematical fields. A report or thesis on a specific aspect of mathematics may be required. An examination is set, covering the whole course.
Prerequisite: Honours Mathematics students only.

Mathematics 70.495*, Honours Project

This consists of a written report on some approved topic or topics in the field of mathematics, together with a short lecture on the report. (Half course).
Prerequisite: Honours Mathematics students only.

Graduate Studies

The Mathematics Department is prepared to direct graduate students in certain branches of Mathematics.

A selection from the following courses will be offered if there is sufficient demand:

Mathematics 70.500, Functional Analysis I

Mathematics 70.502, Functional Analysis II

Mathematics 70.504, Integral Equations

Mathematics 70.510, General Algebra

Mathematics 70.511, Theory of Groups

Mathematics 70.512, Group Representations and Applications

Mathematics 70.513, Theory of Rings

Mathematics 70.514, Algebraic Number Theory

Mathematics 70.523, Algebraic Topology

Mathematics 70.531, Mathematical Logic

Mathematics 70.540, Advanced Classical Mechanics

Mathematics 70.541, Hydrodynamics and Elasticity

Mathematics 70.542, Advanced Electromagnetic Theory

Mathematics 70.543, Wing Theory

Mathematics 70.544, Advanced Applied Mathematics

Mathematics 70.550, Multivariate Analysis

Mathematics 70.551, Advanced Probability Theory

Mathematics 70.552, Statistical Inference

Mathematics 70.590, Directed Studies I — Graduate

Mathematics 70.591, Directed Studies II — Graduate

Mathematics 70.598, Master's Thesis (1 course)

Mathematics 70.599, Master's Thesis

Mathematics 70.699, Doctorate Thesis

Music

Associate Professor   John Churchill
Sessional Lecturer   W. Amtmann

The Department of Music will lay stress on the social and historical aspects of music within the context of Western civilization. In all courses the effort will be made to bring out the relationship between music, the other arts and society. A wide range of musical examples will be used to illustrate the topics of the courses. As in the case of the Department of Art, offerings in Music are intended to complement work in the humanities and not to provide a training in the performing aspects of the subject.

For 1968-69 it will not be possible to undertake a major in the Department of Music. However, courses in Music are freely available as options to students in any degree program in the University.

Music 30.100, Introduction to the Music of Western Civilization

This course will provide a general perspective of musical history during the last two thousand years, with more detailed examination of music from 1600 to 1900. The development of musical ideas and structures will be studied, major composers and movements will be discussed and an analysis of the more important musical forms will be undertaken.
Day Division: 1968-69 (lectures three hours a week).
J. Churchill

Music 30.210, Canadian Music

A study of the history of Canadian music from its earliest manifestations to the present. The social environment of each period will be considered and various influences, both musical and extra-musical, will be discussed.
Prerequisite: Music 30.100 or the approval of the Department.
Day or Evening Division: 1968-69 (lectures two hours a week).
W. Amtmann

Music 30.240, The Baroque in Music

A study of the styles and aesthetics in the period which runs roughly from 1600 to the death of Bach and Handel and which includes *nuove musiche,* the development of opera, oratorio, the orchestra, tonal harmony and new instrumental forms. There will be an attempt to relate these to their social backgrounds and also to show the development of the musical Baroque from Renaissance music and on to the *style galant.*
Day Division: 1968-69 (lectures three hours a week).
J. Churchill

Music 30.250, Music since 1900

This course will survey the breakdown of tonality and the many musical idioms which have arisen in its train. It will include not only the significant European figures but also contemporary Canadian and American composers.
Not offered, 1968-69.

Music 30.260, Materials of Music

The theoretical and practical study of rhythm, melody, harmony, counterpoint and musical structures. The study will be undertaken largely through the development of the students' aural perception, keyboard harmony and written music. It is hoped that the musical idioms of many periods of Western music will be used as examples of study.

Text: Melcher and Warch, *Music for Keyboard Harmony.*

Prerequisite: Music 30.100, some keyboard facility and/or the approval of the Department.

Day or Evening Division: 1968-69 (lectures and seminars three hours a week).

J. Churchill

See also:

Courses in the Department of Art

Philosophy

Professor; Chairman of
the Department   J. C. S. Wernham
Professor   Bernard Wand
Associate Professors   R. S. Talmage, James M. Thompson
Assistant Professors   Stanley G. Clarke, Diane E. Dubrule, Marvin Glass,
     Andrew Jeffrey (on leave of absence, 1968-69),
     John W. Leyden, Randal R. A. Marlin
Sessional Lecturers   K. M. Larose, E. Stephen Williams

Major in Philosophy

Majors in Philosophy will take a minimum of six courses in Philosophy. Special arrangements will be made for students proposing a combined major program. All majors will arrange their programs in consultation with the Department.

A student may not major in Philosophy unless he obtains 60% standing in one of the introductory courses in Philosophy or 66% standing in Humanities 10.100 or Religion 34.100.

Honours Courses

The honours program may be entered at the beginning of the First year, or by transfer from the pass course (see p. 47). An Introduction to Philosophy should be taken in the First year.

The honours program will consist of a minimum of eight courses in Philosophy, plus an honours tutorial which will count as two courses. The student's program for the Second year and subsequent years will be planned in consultation with the chairman of the Department. The following courses will be required: Philosophy 32.205; 32.210; 32.215; 32.220; 32.230; 32.305; 32.490.

With permission of the Department a final year honours student may take either or both of Philosophy 32.520 and Philosophy 32.525.

Combined Honours

Students who are interested in pursuing an honours program in which Philosophy is combined with another subject are invited to discuss the matter with the chairman of the Department of Philosophy. The minimum requirements in Philosophy in this type of program will be six courses plus the honours tutorial which will count as two courses. The following courses will be required: Philosophy 32.205; 32.215; 32.490; either 32.210 or 32.330; either 32.220 or 32.230.

Graduate Studies

The Department of Philosophy offers studies leading to the degree of Master of Arts. For admission to the degree program a student must have an honours degree in Philosophy with at least second class standing, or the equivalent of this. A student who does not already have this requirement will be expected first to complete a qualifying year.

A candidate for the M.A. in Philosophy will (1) take three whole courses or the equivalent (or four, in case his thesis is counted as the equivalent of one course), (2) present a thesis and (3) defend his thesis at an oral examination. One, but not more than one, of the courses taken may (with permission) be an undergraduate course in Philosophy or a graduate or undergraduate course in a related field. Where an undergraduate course is taken the completion of additional assignments may be required. The thesis will normally be counted as the equivalent of two courses. Grades of 66% or better must be obtained in all courses taken, on the thesis and in the oral examination on the thesis.

A student who works for the M.A. in Philosophy on a part-time basis may be required to pass, with a grade of 66% or better, a comprehensive examination in Philosophy. Other candidates will not be expected to write a comprehensive examination.

Philosophy 32.100, Introduction to Philosophy: Religion, Ethics and Inference

In addition to an introduction to traditional and symbolic logic, the course includes treatment of such philosophical questions as the existence of God, the justification of ethical precepts, the meaning of causation and probability and the justifiability of deriving scientific conclusions regarding them from observational evidence.
Day Division: Annually (lectures three hours a week).
S. G. Clarke
Evening Division: 1968-69 (lectures two hours and four hours in alternate weeks).
M. Glass and B. Egyed
Summer: 1968 *Evening Division* (lectures five hours a week).
M. Glass
Summer: 1968 *Day Division* (lectures ten hours a week).
K. M. Larose

Philosophy 32.105, Introduction to Philosophy: Philosophical texts

An examination, both historical and critical, of selected philosophical texts. Works to be studied will include: Plato, *The Republic*: Descartes, *Meditations;* Hume, *An Enquiry Concerning Human Understanding;* Ayer, *Language Truth and Logic,* and one other work to be announced.
Day Division: Annually (lectures three hours a week).
D. Dubrule

Philosophy 32.110, Introduction to Philosophy: Knowledge and Logic

Some problems concerning the sources, nature and extent of knowledge will be discussed in the first term. Topics will include: sense-perception; philosophical claims to knowledge of ultimate reality and the positivist critique of metaphysics; the meaning and justification of value judgments. In the second term an introduction to the methods of modern formal logic will be followed by a discussion of certain problems in the philosophy of science, the central topic being the analysis of explanation in the sciences.
Day Division: Annually (lectures three hours a week).
J. M. Thompson and J. W. Leyden

Philosophy 32.120, Introduction to Philosophy: Reason and Argument

An examination of the nature of controversy and of procedures for help in resolving it by rational means. The course will begin with an introduction to formal logic. Thereafter a variety of extended arguments will be considered. Some of these arguments (about half) will be philosophical; others will be arguments in support of controversial theses in such fields as morals, politics, education and theology.
Day Division: Annually (lectures three hours a week).
R. S. Talmage

Philosophy 32.205, Greek Philosophy

An examination of early speculation in Greece; of the roles of the Sophists and of Socrates; together with a study of selected topics in the works of Plato and Aristotle.
Prerequisite: One of Philosophy 32.100, 32.105, 32.110, 32.120 or permission of the Department.
Day Division: Annually (lectures and discussion three hours a week).
D. Dubrule

Philosophy 32.210, Ethics

A critical analysis of the chief concepts in moral philosophy. In the first term, the moral theories of Hobbes, Butler, Hume, Kant, Bentham and Mill will be examined. The second term, where the emphasis will be on twentieth century writers, will be devoted to such topics as intuitionism, naturalism, emotivism, subjectivism, relativism, freedom and responsibility, act and rule utilitarianism, egoism and supererogation.
Prerequisite: One of Philosophy 32.100, 32.105, 32.110, 32.120 or permission of the Department.
Day Division: Annually (lectures and discussion three hours a week).
M. Glass
Summer: 1968 *Day Division* (lectures ten hours a week).
E. S. Williams

Philosophy 32.215, Modern Philosophy: 1600-1800

An examination of the major philosophical writers of the seventeenth and eighteenth centuries. Selections will be studied from the works of Descartes, Spinoza, Leibniz; Locke, Berkeley, Hume; and Kant.
Prerequisite: One of Philosophy 32.100, 32.105, 32.110, 32.120 or permission of the Department.
Day Division: Annually (lectures and discussion three hours a week).
J. C. S. Wernham
Summer: 1968 *Evening Division* (lectures five hours a week).
J. C. S. Wernham

Philosophy 32.220, Philosophical Analysis

A brief account of the history of the movement in its several branches will be followed by careful study of representative samples of analytic philosophy. The readings will be chosen with a view to exhibiting (a) variations in the conception of analysis, and (b) the application of analytic techniques to a variety of philosophical problems.
Prerequisite: One of Philosophy 32.100, 32.105, 32.110, 32.120 or permission of the Department.
Day Division: Annually (lectures and discussion three hours a week).
S. G. Clarke

Philosophy 32.230, Logic and Philosophy of Science

A study of truth-functional and quantificational logic will be made, together with an elementary discussion of the nature and properties of formalized systems. This will be followed by an examination of the nature and methods of the empirical sciences, special attention being paid to the role, development and structure of scientific theories and to the nature of scientific explanation.
Prerequisite: One of Philosophy 32.100, 32.105, 32.110, 32.120 or permission of the Department.
Day Division: Annually (lectures and discussion three hours a week).
J. W. Leyden

Philosophy 32.240, Aesthetics

Analysis of problems in the description, interpretation and evaluation of works of art, including music, literature and the visual arts; together with the study of types of aesthetic theory.
Prerequisite: One of Philosophy 32.100, 32.105, 32.110, 32.120 or permission of the Department.
Day Division: Annually (seminar two hours a week).
J. M. Thompson

Philosophy 32.250, Philosophy of Mind

An attempt to answer some of the principal questions of the philosophy of mind. Among the topics to be considered will be belief and thinking, pain and pleasure, imagination, intention, emotion, personal identity, the relations between mind and body, the unconscious, mental illness, telepathy and clairvoyance, and our knowledge of other minds.
Prerequisite: One of Philosophy 32.100, 32.105, 32.110, 32.120 or permission of the Department.
Day Division: Annually (lectures and discussion two hours a week).
R. S. Talmage

Philosophy 32.260 (300), Philosophy of Religion

An investigation, both historical and systematic, into the relations between faith and reason; together with an examination of the question of the existence and nature of God. Texts to be studied will be representative of mediaeval Scholasticism, German Idealism, Existentialism, and Philosophical Analysis. (This course is also listed as Religion 32.260 (300)).
Prerequisite: One of Philosophy 32.100, 32.105, 32.110, 32.120 or permission of the Department.
Day Division: Annually (lectures and discussion three hours a week).
J. C. S. Wernham

Philosophy 32.305, Modern Philosophy: 1800-

An examination of some major philosophical writers of the nineteenth and twentieth centuries; German Idealism from Kant to Hegel; the anti-Hegelian philosophies of Marx, Kierkegaard, Schopenhauer and Nietsche; evolution and the philosophy of Bergson; American Pragmatism (James, Peirce, Dewey); Whitehead; a brief sketch of recent philosophy.
Prerequisite: One of Philosophy 32.100, 32.105, 32.110, 32.120 or permission of the Department.
Day Division: Annually (lectures and discussion three hours a week).
J. M. Thompson

Philosophy 32.310, Phenomenology and Existentialism

An examination of recent and contemporary philosophical movements in continental Europe. An account will be given of the historical origins of these movements in the thought of Kierkegaard and Husserl. A comparison will be made between the different treatments of some themes common to contemporary continental European philosophy and Anglo-American philosophy, and an attempt will be made to evaluate them. Special attention will be paid to the philosophy of Sartre. The views of Nietzsche, Heidegger, Jaspers, Scheler, Shestov, Marcel, Merleau-Ponty and Camus, together with some of their commentators, will also be discussed.
Prerequisite: One of Philosophy 32.100, 32.105, 32.110, 32.120 or permission of the Department.
Day Division: Annually (lectures and discussion three hours a week).
R. R. A. Marlin

Philosophy 32.330 (310), Social and Political Philosophy

An analysis of the concepts used to explain and justify social and political thinking or action: state, society, the common good, justice, rights and obligations, punishment and liberty; and a consideration of the moral basis of political obligation.
Prerequisite: One of Philosophy 32.100, 32.105, 32.110, 32.120 or permission of the Department.
Day Division: Annually (seminar or lectures two hours a week).
B. Wand

Philosophy 32.490, Tutorial

J. Leyden

Graduate Courses

Philosophy 32.516*, Descartes (Half Course)

An intensive study of selected texts.
Day Division: Annually (two hours a week, first term).
J. C. S. Wernham

Philosophy 32.517*, Hume (Half Course)

An intensive study of selected texts.
Day Division: Annually (two hours a week, second term).
B. Wand

Philosophy 32.520, Current Problems

A number of recent books and papers on connected themes will be discussed.
Day Division: Annually (seminar two hours a week).
S. G. Clarke and R. S. Talmage

Philosophy 32.525, Kant

An intensive study of some part of Kant's philosophy.
Day Division: Annually (seminar two hours a week).
R. R. A. Marlin and J. W. Leyden

Philosophy 32.590, Graduate Tutorial (equivalent of one course)

Philosophy 32.591*, Graduate Tutorial (equivalent of one half course)

Philosophy 32.598, Master's Thesis (equivalent of one course)

Philosophy 32.599, Master's Thesis (equivalent of two courses)

Physics

Research Professor; Acting Chairman of the Department	E. P. Hincks
Professors	R. L. Clarke, D. Kessler, G. R. Love, M. K. Sundaresan (on leave of absence 1968-69)
Associate Professors	R. D. Barton, A. L. Carter, T. J. S. Cole, K. W. Edwards, A. C. Ghosh, J. E. Hardy
Assistant Professors	D. J. Brown, R. Morrison, L. Resnick
Sessional Lecturers	J. P. Jan, R. Turner
Instructors	D. Gill, H. J. Hunter
Senior Demonstrators	E. Butterill, R. L. Margeson, P. W. R. Sargeant
Demonstrators	A. Buckley, G. Cameron, E. Chung, J. Dunsmoor, J. G. Hollins, G. Larsson, J. Lindsey, B. McIntosh, W. E. Pick, F. E. Raney, E. Rolfe, G. Sangster, B. R. Weston
Senior Technician	K. Hafner
Administrative Assistant to the Chairman	H. E. Koehler

Students taking a single course in physics should take Physics 75.010 or 75.105. Students taking more than one course in physics should take Physics 75.100.

Prerequisites for entry into second year courses are normally Physics 75.100 and Mathematics 69.100. Subject to the recommendation of the major department and the approval of the Physics Department, other combinations of one of Physics 75.100 and 75.105 and one of Mathematics 69.100 and 69.101 may be offered. *Prerequisites for the third year courses starting 1969 will normally be Physics 75.211*, 75.231*, 75.222*, and 75.242*.* (Physics 75.210 is being replaced by Physics 75.211* and Physics 75.242* beginning fall term, 1968-69).

Major in Physics

Typical Pattern (Normal Departmental Requirements)

Year I	*Year II*	*Year III*
Physics 75.100	Physics 75.211*, 75.242*	Physics 75.300
Chemistry 65.100	Physics 75.231*, 75.222*	Physics 75.309
Mathematics 69.100	Mathematics 69.205*	Physics 75.321*
Biology 61.100 or	Mathematics 69.245*	Physics 75.341*
Geology 67.100	Mathematics 69.215*	Physics 75.360
One course in the	Mathematics 69.257*	Mathematics 69.307* and
Humanities or Social	One Humanity or	69.308*
Sciences numbered 100 or	Social Science	One Humanity or
higher chosen with the		Social Science
approval of the Department		

Honours Course

Typical Pattern (Normal Departmental Requirements)

Year I	*Year II*
As for Physics Major Course	As for Physics Major Course, but Mathematics 70.200 may be substituted for Mathematics 69.205* and 69.245*

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Year III	Year IV
Physics 75.300	Physics 75.400
Physics 75.309	Physics 75.437*
Physics 75.317*	Physics 75.447*
Physics 75.321*	Physics 75.458*
Physics 75.338*	Physics 75.468*
Physics 75.341*	Physics 75.476
Physics 75.360	Physics 75.499
Mathematics 69.307* and one of 69.308*,	
70.309*	
One Humanity or Social Science	

During the vacation between Year III and Year IV, students are required to familiarize themselves with a specialized topic; they will deliver a fifty minute dissertation upon that subject during the first term of the Year IV. Comprehensive examinations are given in physics and related mathematics and the student must submit a thesis on his work carried out in Physics 75.499. The fulfilment of the requirements stated in this paragraph is the responsibility of the student.

Combined Honours Course in Mathematics and Physics
Typical Pattern (Normal Departmental Requirements)

Year I	Year II
Physics 75.100	Physics 75.211*, 75.242*
Chemistry 65.100	Physics 75.231*, 75.222*
Mathematics 69.100	Mathematics 70.200
Biology 61.100 or Geology 67.100	Mathematics 70.210
One course in the Humanities or Social	Mathematics 70.245*
Sciences numbered 100 or higher chosen	Mathematics 70.257*
with the approval of the Department	One Humanity or Social Science

Year III	Year IV
Physics 75.307*	Physics 75.407*
Physics 75.317*	Physics 75.437*
Physics 75.341*	Physics 75.447*
Physics 75.360	Physics 75.476
Mathematics 70.300	One Mathematics course at the
Mathematics 70.307* and 70.309*	Fourth year level
Mathematics 70.310	Physics 75.499 *or* Mathematics 70.495*
Mathematics 70.341	and another Half Course in
	Mathematics at the 400 level
	One Mathematics or Physics Course

During Year IV comprehensive examinations are given.

Graduate Studies

Candidates for the Doctor's and Master's degrees are accepted for full-time work in the physics research laboratories under the supervision of members of the Department. The requirements and general regulations of the Faculty of Graduate Studies are applicable. A Master's degree may be obtained on a part-time basis. Full particulars of the requirements for Graduate Studies may be obtained by writing to the Department.

Language

Candidates for the degree of Bachelor of Science with Honours in Physics or combined Honours in Mathematics and Physics must show a reading knowledge of French, German, or Russian. Requests for examination should be submitted to the Chairman of the Department by February 15; application for examination is the responsibility of the student. Graduate students are required to satisfy a prescription specified by their Supervisor in consultation with the Department.

Summer School Offerings

Physics 75.100, Physics 75.476 will and Physics 75.317* may be offered in the 1968 Summer School program (Evening Division).

Physics 75.010, Pre-University Physics

Evening Division: 1968-69 (lectures two hours a week, laboratory demonstrations and problems two hours a week).

Physics 75.100, Introductory Physics

This course introduces mechanics, the properties of matter, electricity and magnetism, wave motion, optics, acoustics and some modern topics. A balance is maintained between depth and range.
Text: To be announced.
Prerequisites: Mathematics 69.010 and Mathematics 69.011 or equivalents; Physics 75.010 or permission of the Department.
Day Division: Annually (lectures three hours a week, laboratory three hours a week).

Physics 75.105, Introductory Physics

An alternate first year course for students who lack the prerequisite for Physics 75.100 or who intend to take their major work in a department not requiring Physics 75.100.
Text: To be announced.
Prerequisite: Mathematics 69.010 or equivalent.
Day Division: Annually (lectures three hours a week, laboratory three hours a week).

Physics 75.211, Mechanics and Properties of Matter*

Classical mechanics of a particle and rigid body. Classical properties of matter.
Text: Berkeley Physics Course, Vol. 1.
Prerequisites: Physics 75.100, Mathematics 69.100[1].
Day Division: Annually (lectures three hours a week, laboratory three hours a week).
Evening Division: 1968-69, first term (lectures three hours a week, laboratory three hours a week).

[1]Physics 75.105 and Mathematics 69.101 are also acceptable prerequisites provided a minimum grade of 70% is obtained in these courses.

Physics 75.222*, Wave Motion and Optics

Wave motion and acoustics. Interference and diffraction phenomena studied starting from Huygen's principle. Applications to interferometry.
Text: To be announced.
Prerequisites: Physics 75.100, Mathematics 69.100.[1]
Day Division: Annually, second term (lectures three hours a week, laboratory three hours a week).

Physics 75.230, Electricity and Magnetism

The theory of electric and magnetic fields is covered in some detail as is electromagnetism and electromagnetic induction. D.C. and A.C. circuit theory is presented and the principles of complex numbers and complex circuit theory are discussed briefly. Conduction in vacuum, and in solid conductors, semi-conductors and insulators is discussed as a preliminary to a brief introduction to vacuum tubes and solid state devices. The laboratory deals primarily with electrical measurements.
Text: Kipp, *Electricity and Magnetism.*
Laboratory Instructions for Physics 75.230.
Reference: Sears and Zemansky, *University Physics.*
Prerequisites: Physics 75.100, Mathematics 69.100.[1]
Day Division: Annually (lectures three hours a week, laboratory three hours a week).

Physics 75.231*, Electricity and Magnetism

Electrostatics, charges and fields. Electric potential and fields around conductors. Electric currents, field of moving charges. Magnetic field. Electromagnetic induction. Alternating current circuits.
Text: *Berkeley Physics Course*, Vol. 2.
Prerequisites: Physics 75.100, Mathematics 69.100[1].
Day Division: Annually, first term (lectures three hours a week, laboratory three hours a week).

Physics 75.242*, Heat and Thermodynamics

Heat, and kinetic theory. Discussion of theory of specific heats and introduction to transport phenomena. Method of thermodynamics and application of laws of thermodynamics.
Text: To be announced.
Prerequisites: Physics 75.100, Mathematics 69.100.[1]
Day Division: Annually, second term (lectures three hours a week, laboratory three hours a week).
Evening Division: 1968-69, second term (lectures three hours a week, laboratory three hours a week).

Physics 75.300, Third Year Laboratory

Text: Barford, *Experimental Measurements*: *Precision, Error and Truth.*
Reference: Malmstadt, Enke and Toren, *Electronics for Scientists.*
Day Division: Annually (laboratory six hours a week).

[1]Physics 75.105 and Mathematics 69.101 are also acceptable prerequisites provided a minimum grade of 70% is obtained in these courses.

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Physics 75.307*, Selected Experiments from Physics 75.300

Text: Barford, *Experimental Measurements: Precision, Error and Truth.*
Day Division: Annually (laboratory three hours a week).

Physics 75.309, Laboratory Technique

During this course the student learns basic technical operations used in the design and construction of research apparatus. *This is a non-credit course.*
Prerequisite: Permission of the Department.
Day Division: Annually (workshop three hours a week).

Physics 75.317*, Mathematical Physics I

Classical dynamics: linear motion of a particle, energy integral, conservation of energy; oscillatory motion, free and forced; damping, Q value, forced motion under external forces; motion in two and three dimensions; conservation laws. Motion of rigid bodies in a plane. Coupled systems and normal coordinates. An elementary discussion of principles of fluid mechanics. Study of wave equation and its solution for vibrating string and membrane. Equation of heat conduction. Fourier analysis as applied to these problems.
Text: Fowles, *Analytical Mechanics.*
Prerequisites: Physics 75.210 and 75.230; Mathematics 70.200 or Mathematics 69.205*, 69.245*.
Day Division: Annually, all year (lectures two hours a week).

Physics 75.321*, Optics

Interference and diffraction phenomena with polarized and unpolarized light are studied starting from Huygen's principle. Applications to interferometry are discussed.
Text: To be announced.
Prerequisites: Physics 75.210 and 75.230; Mathematics 70.200 or Mathematics 69.205*, 69.245*.
Day Division: Annually, first term (lectures three hours a week).

Physics 75.338*, Electromagnetism

The experimental laws of electricity and magnetism are reformulated in the notation of the vector calculus as Maxwell's equations. Formal solutions of potential problems are discussed. Some mention is made of the properties of dielectric and magnetic materials.
Text: To be announced.
Prerequisites: Physics 75.210 and 75.230; Mathematics 70.200 or Mathematics 69.205*, 69.245*.
Day Division: Annually, second term (lectures three hours a week).

Physics 75.341*, Thermodynamics

The method of thermodynamics and the first and second laws are discussed exhaustively. Applications of the laws are discussed in fair detail. The course includes the theory of specific heats and an introduction to the theory of transport phenomena.
Text: Vanderslice, Schamp and Mason, *Thermodynamics.*
Prerequisites: Physics 75.210 and 75.230; Mathematics 70.200 or Mathematics 69.205*, 69.245*.
Day Division: Annually, first term (lectures three hours a week).

Physics 75.360, Atomic Physics

The course is designed to provide a logical transition from classical to modern physics. The determination of the specific charge of ions, Rutherford and Compton scattering, optical and x-ray spectroscopy are examined. Some discussion is given of special relativity and the Schrödinger equation with an introduction to molecular spectra, solid state physics and nuclear physics.
Text: Semat, *Introduction to Atomic and Nuclear Physics.*
Prerequisites: Physics 75.210 and 75.230; (or Engineering 81.211, 81.220 and 90.340); Mathematics 70.200 or Mathematics 69.205*, 69.245*.
Day Division: Annually (lectures three hours a week).

Physics 75.400, Fourth Year Laboratory

Prerequisite: Physics 75.300.
Day Division: Annually (laboratory four hours a week).

Physics 75.407, Selected Experiments from Physics 75.400*

Prerequisite: Physics 75.300 or 75.307*.
Day Division: Annually (laboratory three hours a week).

Physics 75.437, Electromagnetic Radiation*

Electromagnetic wave propagation in a vacuum, dielectric, conductor, and ionized gas. Reflection, refraction, polarization at the plane boundary between two media. Waveguide and transmission line propagation. Dipole and quadrupole radiation fields. Antenna systems.
Text: To be announced.
Prerequisite: Physics 75.338* (except for Combined Honours students).
Day Division: Annually, first term (lectures three hours a week).

Physics 75.447, Statistical Physics*

The course begins with a brief discussion of the application of statistics to physical measurements. This is followed by an elementary study of classical and quantum statistical mechanics. Maxwell-Boltzman, Bose-Einstein, and Fermi-Dirac statistics are derived, and applied in appropriate physical situations. The relation between thermodynamics and statistical mechanics is considered. Kinetic and transport theories are discussed.
Text: Desloge, *Statistical Physics.*
References: Whittaker and Watson, *The Calculus of Observations.*
K. Huang, *Statistical Mechanics.*
Prerequisite: Physics 75.341*.
Day Division: Annually, first term (lectures three hours a week).

Physics 75.458, Electron Physics*

Applications of electron physics.
Text: Hemenway, Henry and Caulton, *Physical Electronics.*
Prerequisite: Physics 75.447*.
Day Division: Annually, first term (lectures three hours a week).

Physics 75.468*, Nuclear Physics

The course starts where Physics 75.360 left off; basic facts about nuclei and nuclear forces are discussed in further detail. The passage of charged particles and radiation through matter is described. A detailed study of the alpha and beta instability of nuclei is followed by a discussion of nuclear excited states, gamma emission and internal conversion. Nuclear models are introduced with particular emphasis on the shell model. After a discussion of nuclear reactions, the course is rounded off with a review of particle physics.
Text: Enge, *Introduction to Nuclear Physics*.
Prerequisite: Physics 75.360.
Day Division: Annually, second term (lectures three hours a week).

Physics 75.476, Mathematical Physics II

Classical dynamics: Lagrange's and Hamilton's equations and their application to some problems in dynamics. Hamilton's principle. Euler angles, spinning top.
Quantum mechanics: Schrodinger and Heisenberg methods are studied in some detail and applied to problems in one and three dimensions. Elements of perturbation theory and simple applications. Elements of scattering theory. Dirac's theory of the electron and its non-relativistic approximation. Special relativity: Lorentz transformations. Invariance of Maxwell's equations under Lorentz transformations.
Prerequisite: Physics 75.317*.
Day Division: Annually (lectures three hours a week).

Physics 75.499, Fourth Year Project

These are advanced projects of an experimental or theoretical nature with an orientation towards research. The presentation of a thesis is required; the fulfilment of this requirement is the responsibility of the student.
Prerequisite: Permission of the Department.
Day Division: Annually (a minimum of six hours laboratory or private study a week).

Physics 75.501*, Methods of Theoretical Physics I

This course and Physics 75.502* are designed for students who wish to acquire a wide background of mathematical techniques. Lectures and problem work are designed to give a working knowledge of the principal mathematical methods used in advanced Physics. In this part of the course, the following topics are covered: Infinite series, Fourier series and integrals, Laplace transforms, complex variables, generalized functions.
Prerequisite: Permission of the Department.
Day Division: Annually, first term (lectures three hours a week).

Physics 75.502*, Methods of Theoretical Physics II

This is a continuation of Physics 75.501*. Topics include, group theory, discussions of SU2, SU3 and other symmetry groups, Lorentz group. Integral equations and eigenvalue problems.
Prerequisite: Permission of the Department.
Day Division: Annually, second term (lectures three hours a week).

Physics 75.511*, Classical Mechanics and Theory of Fields

Hamilton's principle. Conservation laws. Canonical transformations. Hamilton-Jacobi theory. Lagrangian formulation of classical field theory.
Prerequisite: Permission of the Department.
Day Division: Annually, first term (two 1½-hour lectures a week).

Physics 75.532*, Classical Electrodynamics

Covariant formulation of electrodynamics. Lenard-Wiechert potentials. Radiation reaction. Plasma physics, Dispersion relations.
Prerequisite: Permission of the Department.
Day Division: Annually, second term (two 1½-hour lectures a week).

Physics 75.541*, The Fundamental Principles of Statistical Mechanics

Discussions of equilibrium statistical mechanics.
Prerequisites: Physics 75.511*, 75.532*, 75.570.
Day Division: Annually, first term (lectures three hours a week).
Not offered, 1968-69.

Physics 75.542*, Non-equilibrium Statistical Mechanics

Boltzmann equation. BBGKY hierarchy. Chapman Enskog theory.
Prerequisites: Physics 75.511*, 75.532*, 75.570.
Day Division: Annually, second term (lectures three hours a week).
Not offered, 1968-69.

Physics 75.561*, Intermediate Nuclear Physics I

The interaction of radiation and high energy particles with matter. Experimental methods of detection and acceleration of particles. Counting statistics.
Prerequisites: Physics 75.437*, 75.468*, 75.476.
Day Division: Annually, first term (lectures three hours a week).

Physics 75.562*, Physics of Elementary Particles

A complete survey of the properties of elementary particles from a phenomenological viewpoint. Classification of the particles and of the forces between them. Conservation laws and invariance principles.
Prerequisites: Physics 75.561*, permission of the Department.
Day Division: Annually, second term (lectures three hours a week).

Physics 75.564*, Intermediate Nuclear Physics II

Nuclear systems, alpha, beta and gamma emission. Shell model, Collective model. Nuclear forces. Reactions and scattering. Neutron physics, Pion physics.
Prerequisites: Physics 75.437*, 75.468*, 75.476.
Day Division: Annually, second term (lectures three hours a week).

Physics 75.571*, Intermediate Quantum Mechanics with Applications

After a review of basic postulates of quantum mechanics, application of quantum mechanics to non-relativistic systems — atoms, molecules and nuclei is the main topic of this course, ending up with Dirac's one particle theory.
Prerequisite: Physics 75.476.
Day Division: Annually, first term (lectures three hours a week).

Physics 75.572*, Relativistic Quantum Mechanics

The course starts with relativistic wave equations and considers applications of relativistic quantum mechanics and concludes with renormalization problems in quantum electrodynamics.
Prerequisite: Physics 75.476.
Day Division: Annually, second term (lectures three hours a week).

Physics 75.581*, Solid State Physics I

Crystal structures. Diffraction and the reciprocal lattice. Crystal binding. Elastic constants and elastic waves. Phonons and lattice vibrations. Electrical and thermal properties, free electron gas, energy bands.
Text: C. Kittel, *Introduction to Solid State Physics,* 3rd edition.
Prerequisite: Physics 75.476.
Day Division: Annually, first term (lectures three hours a week).

Physics 75.582*, Solid State Physics II

Dielectrics and ferroelectrics. Diamagnetism, paramagnetism, ferromagnetism and antiferromagnetism. Magnetic resonance. Superconductivity. Optical phenomena. Transport properties. Defects in solids.
Text: C. Kittel, *Introduction to Solid State Physics,* 3rd edition.
Prerequisite: Physics 75.581.
Day Division: Annually, second term (lectures three hours a week).

Physics 75.590, Selected Topics in Physics

During a full course of post-graduate study a student may, with the permission of the Department, take more than one selected topic. In that case each full course in Physics 75.590 will be counted for credit. Not more than one selected topic may be counted for credit in any one academic year.
Members of the Department

Physics 75.599, Graduate research leading to a Master's degree thesis

Physics 75.660, Advanced Nuclear Physics

The following topics are studied: nucleon-nucleon interaction with a detailed study of low and high energy scattering experiments; nuclear models with special emphasis on the shell model and the collective model; nuclear reactions; direct interactions; electromagnetic transitions in nuclei and the experimental determination of level parameters; beta decay; the scattering of electrons and the form factors of nuclei and nucleons.
Prerequisites: Physics 75.511*, 75.532*, 75.565, 75.570.
Day Division: Annually (seminars three hours a week).

Physics 75.670, Advanced Quantum Mechanics

An introduction to quantum field theory. The course begins with a discussion of the Poincaré group and its representations. This is followed by an introduction to second quantization, applied in particular to the Dirac and electromagnetic fields. Then the formal theory of scattering (S-matrix theory) is reviewed and applied to simple models. After an introduction to quantum electrodynamics, the course will move on to specialized topics (negotiable).
Prerequisites: Physics 75.511*, 75.532*, 75.570.
Day Division: Annually (lectures three hours a week).

Physics 75.699, Graduate research leading to a Doctor's degree thesis

*An asterisk attached to a course number indicates a half course.

Political Science

Professor; Chairman
of the Department   Adam Bromke
Professors   Douglas G. Anglin (on leave of absence, 1968-69),
Pauline Jewett, Peyton V. Lyon (on leave of absence,
1968-69), R. O. MacFarlane, Henry B. Mayo,
K. D. McRae, Khayyam Z. Paltiel, Donald C. Rowat
(on leave of absence, 1968-69)
Associate Professors   Claude Ake, Teresa R. Harmstone, Harald von Riekhoff,
A. M. Willms
Assistant Professors   Jon Alexander, Charles M. Dalfen, G. Bruce Doern,
Larry G. Kjosa, Willard A. Mullins, John R. Nellis,
George Roseme, Paul Rosen, Garth Stevenson,
Elliot L. Tepper, Michael S. Whittington
Visiting Professors   Alastair Buchan, Eugene A. Forsey
Sessional Lecturers   R. H. Dowdell, N. A. Robertson
Supervisor of
Graduate Studies   Teresa R. Harmstone
Supervisor of Honours   George Roseme
Supervisor of Majors   Willard A. Mullins

Ottawa provides a wealth of resources, both in personnel and in research materials, for the student of government, politics, public administration, and international relations. Undergraduates will be assisted in making the fullest use of these unique advantages of the national capital. The Political Science department offers courses in the following fields of study: Canadian Government and Politics; Comparative Institutions and Politics; Public Administration and Public Law; International Relations; Political Theory and Methodology.

Major Program (3 Years)

A major in Political Science requires Political Science 47.100 and five or more additional courses in the Department. The Department strongly recommends that Political Science 47.230 and 47.270 be chosen as two of the five additional courses, especially if students are planning to go on to graduate studies.

A combined major, including Political Science, requires Political Science 47.100 and three or more additional courses. Majors are advised to take Mathematics 69.130 as their First year mathematics or science option and should take a number of courses in related Social Sciences. Final year majors with the required standing may, with permission, be admitted to Fourth year honours courses. The entire program must be approved by the Department.

A major must obtain at least 60% in Political Science 47.100 to enter Second year and must maintain an overall average of at least 60% in his Political Science courses to continue into Third year. For special supplemental examinations to raise grades (see page 45).

Honours Programs (4 Years)

The honours programs may be entered in the First year, from First year Honours in the Social Sciences (see p. 53), or by transfer from pass programs, if sufficient standing has been obtained. An honours student may be approved for a pass degree at the end of the Third year if the requirements under the major program have been completed. The following programs are available:

Political Science
For full honours, nine courses in Political Science will be required, including (a) Political Science 47.100; (b) 47.231; (c) one of 47.210, 47.220, 47.310, 47.320, 47.405; (d) 47.270; (e) one of 47.300, 47.340, 47.400, 47.450; (f) 47.498; and three free options, including courses at the 500 level with the permission of the Department. At least one of the courses taken in this program should be a seminar. Candidates present a graduation essay on some topic involving independent investigation; they may be examined orally on this essay and must receive a grade of at least 66% for it. They must select a minor field or fields, preferably in Economics, History, Philosophy or Sociology, and by the final year must show a reading knowledge, sufficient for research, of a language other than English, preferably French, German, or Russian. They are advised to take Mathematics 69.130 as their First year mathematics or science option.

Combined Honours
Students intending to enter a program combining Political Science with another discipline should in their First year take Political Science 47.100 and the introductory course in the other discipline. Combined honours require at least six courses in Political Science including 47.100, 47.231, 47.270 (unless an equivalent course is taken in another discipline), one course from sections (c) and (f) of the full honours program described above; two free options. Students must meet the same Fourth year requirements in each department as for single honours, except that the graduation essay may be written for either department and preferably should make use of both disciplines. For combined honours with Philosophy the student must take both Philosophy 32.490 and Political Science 47.498.

At present students may take combined honours in Political Science and either Economics, French, Geography, History, Philosophy or Sociology. Combinations with other subjects will also be considered. All combined honours programs will be arranged so that the student may transfer to full honours in either discipline at the end of the Third year, if he then wishes to specialize more intensively.

Graduate Programs
The Department offers programs leading to the degrees of Master of Arts and Doctor of Philosophy. Facilities for specialized graduate study and research are currently available in the following fields:

Political Theory: historical and analytical.

Political Institutions: comparative government—American, European, Soviet, Commonwealth, and African; federalism; political parties, political process, and political sociology.

Canadian Government: Federal; provincial and local; constitutional law.

Public Administration: Canadian and comparative; administrative law.

International Relations: analytical, diplomatic, and institutional; international law; foreign relations of Canada, the United States, and of the Communist and African states.

For the Graduate Diploma in Public Administration and the Master of Arts in Public Administration (see p. 63-65).

Master of Arts Program (full-time or part-time)
Admission. Students having an honours degree or the equivalent in Political Science with at least a second class standing may complete the requirements for the M.A. in one academic year. Honour graduates in fields other than Political Science will be considered on the basis of their courses of study and standing. Those with deficiencies may have to take qualifying year or additional courses. Graduates having a pass bachelor's degree in Political Science, with at least second class standing, may be

admitted but must complete a qualifying year with an average of at least 68% (with no more than two grades below 66% and none below 60%) before proceeding to the M.A. year. For further details, consult the Department's Supervisor of Graduate Studies.

Degree Requirements
1. An approved number of graduate courses in Political Science (one, or in exceptional cases two, of these may be below the 500 level), including political theory and political inquiry (Political Science 47.270 or its equivalent) if not already taken.
(a) Five approved courses in Political Science. This option is open only to full-time students on a five-unit pattern, with a high second class average, intending to proceed to the Ph.D., and is to be completed in the academic year.
<p align="center">OR</p>
(b) Four approved courses in Political Science plus a research essay (Political Science 47.598) tied to one of the courses. This option will be taken primarily by full-time students on a five-unit pattern with normal entrance requirements, and is to be completed in the academic year.
<p align="center">OR</p>
(c) Three approved courses in Political Science plus a thesis involving original research in an approved field (Political Science 47.599) equivalent to two courses. This option will be taken primarily by part-time students and by full-time students on a six- or seven-unit pattern. If a student has already taken an M.A. degree, including a thesis, in another discipline, he may take two additional graduate courses instead of the thesis.
2. A comprehensive oral examination on approved major and minor fields chosen from the following list: political theory, Canadian government, comparative government, political behaviour and the political process, public administration, international relations. Students may also minor in: public law, provincial and local government (unless the major is Canadian government), Soviet or African studies, an approved field in a related discipline.
3. A reading knowledge, sufficient for research, of an appropriate language other than English, preferably French.
4. At least good second class standing (an average of 68%, with no more than one grade below 66% and none below 62%).
   Candidates will be assigned a supervisor who will advise them on their work, including their preparation for the comprehensive and language examinations.

Doctor of Philosophy Program (full-time only)
This program is designed to give selected students a professional qualification in Political Science.

Admission. Applications will be considered from outstanding students who have taken the Master of Arts degree or its equivalent in Political Science, Public Administration or International Affairs, with at least high second class standing. Such candidates may be required to take qualifying courses to remedy deficiencies in their background. Other applicants will be expected to take the Master's degree first. All students will be expected to have or acquire an adequate basic knowledge of political theory, political inquiry (Political Science 47.270 or its equivalent), and Canadian government, regardless of their fields of concentration, and an acquaintance with disciplines closely related to Political Science. They will also be expected to take further work in statistics if this is needed for preparation of the thesis. A qualifying examination may be set in one or more fields in order to determine eligibility of admission. For further details consult the Department's Supervisor of Graduate Studies.

Degree requirements:

These will entail at least two years of full-time study beyond the Master's degree. The comprehensive examination will normally be taken during the second year.

1. At least three graduate courses, and directed study in accordance with individual needs. The student must complete his courses with at least a high second class average before proceeding to the comprehensive examination.

2. A written and oral comprehensive examination in three approved fields of concentration chosen from the following list.

(1) *Political Theory*: A general knowledge of political theory and analysis, with emphasis on one of the following topics: (a) ancient and mediaeval political thought; (b) the history of political thought from Machiavelli to the present; (c) nineteenth and twentieth century political thought, including recent developments in political analysis.

(2) *Political Institutions and Processes*: A general knowledge of comparative theory and of the political institutions and processes of the major powers, with emphasis on one of the following topics: (a) political parties and the political process; (b) federal and/or local government; (c) comparative government with reference to an approved combination of countries, which must not unduly overlap (5); (d) Canadian Government and Politics, if Canada not chosen under (5).

(3) *International Relations*: A general knowledge of theory, institutions, and world history since 1914, with emphasis on one or more of the following topics: (a) analytical theory; (b) foreign policies of particular states; (c) international institutions and law.

(4) *Public Administration*: A general knowledge of theory and practice with emphasis on at least two of the following topics: (a) theories; (b) Canada; (c) comparative, with reference to an approved combination of countries; (d) administrative law.

(5) *The Politics of a Particular Country or Area*: An intensive study of the political institutions, processes, ideas, and international relations of a single country or area. Students will be expected to be acquainted with the relevant historical, social, and economic aspects of their subject. For the present, approved areas of study are: (a) Britain; (b) The United States; (c) selected Communist countries; (d) Africa, or part of it; (e) Canada.

(6) An approved field in a related discipline may be substituted for (5) above.

Candidates will be expected to pass their comprehensive examination before embarking on the thesis.

3. A thesis written in English or French, and defended orally in English. The oral examination may include matters related to the general field of the thesis. Although Ottawa is rich in research facilities in some fields, students may pursue their investigations elsewhere when this is advantageous.

4. Language requirements: The ability to read and translate French easily and to converse in French with moderate fluency. This requirement must be met before the comprehensive examination. The oral part of the requirement may be met by successful completion of French 20.201. Candidates from outside Canada may be permitted to offer a reading knowledge of another main language in place of French. Candidates must also be able to read a third language appropriate to their program. (In lieu of a third language a candidate may offer a statistics option, Economics 43.220 *or* Mathematics 69.250 *and* Engineering 80.065—this is in addition to the political inquiry course required of all graduates.) This requirement should be met before the comprehensive examination and must be met before the outline of the thesis is approved.

A supervisor and two other advisers will be assigned to each student to advise him on his studies. His whole program must be approved by the Department's Supervisor of Graduate Studies in the light of the student's needs and interests, and the Department's resources.

First Year

Political Science 47.010, Public Administration for Overseas Students

A special course designed for students taking the Course in Administration for Overseas Public Servants under the auspices of the External Aid Office. Other students from overseas may be admitted with the permission of the instructor.
Day Division: 1968-69 (lectures and discussion groups, six hours a week, plus visits and tutorials).
J. R. Nellis and A. M. Willms

Political Science 47.100, Introduction to Political Science

Modern political ideas and institutions, with particular attention to Canada, Britain, and the United States.
Day Division: Annually (lectures and discussion three hours a week).
C. M. Dalfen and G. Roseme
Evening Division: Annually (lectures and discussion three hours a week).
M. S. Whittington
Summer: 1968 *Day Division* (lectures and discussion ten hours a week).
G. Roseme
Summer: 1968 *Evening Division* (lectures and discussion five hours a week).
R. J. Jackson and R. Fagen

Second Year: Majors and Honours

Political Science 47.210, Government and Politics in Western Europe

Britain, France, Western Germany, and other European democracies.
Prerequisite: Political Science 47.100.
Day Division: 1968-69 (lectures and discussion three hours a week).
G. Stevenson

Political Science 47.220, Government and Politics in the United States

American political thought, constitutional development, and the governmental process.
Prerequisite: Political Science 47.100.
Day Division: 1968-69 (lectures and discussion three hours a week).
J. Alexander

Political Science 47.230, History of Political Thought

The development of Western political theory and related aspects of intellectual history from classical times to the end of the eighteenth century. Readings from Plato, Aristotle, Machiavelli, Bodin, Hobbes, Locke, Rousseau, Burke and others.
Prerequisite: Political Science 47.100 or permission of the Department.
Day Division: 1968-69 (lectures and discussion three hours a week).
H. B. Mayo and P. L. Rosen
Evening Division: Annually (lectures and discussion three hours a week).
P. L. Rosen
Summer: 1968 *Day Division* (lectures and discussion ten hours a week).
P. L. Rosen

Political Science 47.231, History of Political Thought

Same as Political Science 47.230, but at a deeper level, for honours and graduate students in any discipline. An analysis of classical philosophy and its modern form.
Prerequisite: Political Science 47.100 or permission of the Department.
Day Division: 1968-69 (seminar three hours a week).
K. D. McRae

Political Science 47.260, International Politics

The structure of the international system: a survey of concepts such as the balance of power, collective security and bipolarization, illustrated by reference to current problems; an introduction to the foreign policies of selected countries.
Prerequisite: Political Science 47.100 or permission of the Department.
Day Division: 1968-69 (lectures and discussion three hours a week).
E. L. Tepper
Evening Division: 1968-69 (lectures and discussion three hours a week).
G. Stevenson
Summer: 1968 *Evening Division* (lectures and discussion five hours a week).
L. R. Pratt and S. R. Thompson

Political Science 47.270, Political Inquiry

This course introduces the student to the elements of systematic political analysis. It covers all present modes of inquiry in the discipline, including survey research methods and their statistical background.
Prerequisite: Political Science 47.100.
Day Division: 1968-69 (lectures two hours a week; laboratory two hours a week).
C. Ake and L. G. Kjosa

Third Year: Majors and Honours

Political Science 47.300, Canadian Government and Politics

A critical examination of Canadian federalism, parliamentary and bureaucratic institutions, political parties, pressure groups, political behavior, power and leadership.
Prerequisite: Completion of first year. (Third year Majors in other disciplines may take this course without having taken Political Science 47.100).
Day Division: 1968-69 (lectures and discussion three hours a week).
M. S. Whittington
Evening Division: 1968-69 (lectures and discussion three hours a week).
E. A. Forsey

Political Science 47.310, The Politics of Developing Areas

The evolution and working of political institutions in the developing countries of Asia and Africa.
Prerequisites: Political Science 47.100 and preferably a further course in Political Science.
Day Division: 1968-69 (lectures and discussion three hours a week).
R. Nellis

Political Science 47.320, Soviet Government and Politics

Soviet political institutions and the role of the Communist Party. The impact of the Soviet political model on China, Yugoslavia and other communist countries.
Prerequisites: Political Science 47.100 and preferably a further course in Political Science or History 24.260.
Day Division: 1968-69 (lectures and discussion three hours a week).
G. Roseme

Political Science 47.333, Modern Political Thought and Ideology

An analysis of the leading political thinkers and ideologies since 1800. Students are recommended, but not required to take Political Science 47.230 before taking this course.
Day Division: 1968-69 (lectures and discussion three hours a week).
W. A. Mullins

Political Science 47.340, Public Administration

A survey of administrative theory and the functions and responsibilities of the government manager, with particular reference to the federal government of Canada.
Prerequisites: Political Science 47.100 and preferably a further course in Political Science.
Day and Evening Divisions: (lectures and seminars three hours a week).
A. M. Willms
Summer: 1968 *Evening Division* (lectures and discussion five hours a week).
A. M. Willms and V. S. Wilson

Political Science 47.360, Theories of International Relations

The concept of systems in International Relations; functional analysis; game theory; techniques of negotiation and bargaining; problems of personality; integration and disintegration.
Prerequisite: Political Science 47.260 or History 24.380.
Day Division: 1968-69 (lectures and discussion three hours a week).
H. von Riekhoff

The following Third year courses, offered by other Departments may, with the approval of the Department, be counted as Political Science courses for degree requirements:

Accounting 41.340, *Government Accounting and Finance*

Philosophy 32.330, *Social and Political Philosophy*

Public Law 51.350, *Elements of Law*

Sociology 53.345, *Power and Stratification*

Sociology 53.350, *Political Behavior*

Fourth Year: Honours and Graduate

Third year honours students, and majors with equivalent standing, may with permission of the Department be admitted to these seminars.

Political Science 47.400, Government of Canada

Student reports on specific topics will be presented and discussed.
Prerequisites: Political Science 47.100 and a further course in Political Science.
Day Division: 1968-69 (seminar three hours a week).
P. Jewett
Day and Evening Divisions: 1968-69 (seminar three hours a week).
R. O. MacFarlane and K. Z. Paltiel
Evening Division: 1968-69 (seminar three hours a week).
Lecturer to be announced
Summer: 1968 *Evening Division* (seminar five hours a week).
R. P. Dyck and G. L. Kristianson

Political Science 47.405, Federalism

Contemporary approaches to the problems of federalism in selected countries, with particular reference to Canada.
Prerequisites: Political Science 47.100 and a further course in Political Science.
Not offered, 1968-69.

Political Science 47.430, Modern Political Thought

The major political ideas of the nineteenth and twentieth centuries.
Prerequisite: Political Science 47.230, or permission of the Department.
Day Division: 1968-69 (seminar three hours a week).
P. L. Rosen

Political Science 47.440, Personnel Administration

Includes theories of human relations in management, unionism in the public service, supervision and motivation; the techniques of staffing, pay administration, employee appraisal, performance review and staff development. Lectures, case studies and seminar discussions are used.
Prerequisite: Political Science 47.100; and Political Science 47.340 is desirable.
Evening Division: 1968-69 (lectures and discussion three hours a week).
R. H. Dowdell

Political Science 47.460, International Institutions

Their origins, structure and functioning, with emphasis on the United Nations.
Prerequisite: Political Science 47.260 or History 24.380, or permission of the Department.
Evening Division: 1968-69 (seminar three hours a week).
C. M. Dalfen
Summer: 1968 *Evening Division* (seminar five hours a week).
C. M. Dalfen

Political Science 47.470, Political Research Design and Data Analysis

The framing of quantitative research problems, including hypothesis formation and testing, application of models, sampling, scaling techniques, and computer and data processing techniques. Specific application will be made to such fields as voting, legislative, judicial and administrative behavior.
Prerequisite: Political Science 47.270 or its equivalent.
Day Division: 1968-69 (seminar three hours a week).
L. G. Kjosa

Political Science 47.490, Tutorial in a Selected Field

Members of the Department are prepared to give reading courses in political behaviour, the government and politics of the following countries or areas: Britain, Western Germany, the Middle East, or Africa South of the Sahara.
Day Division: 1968-69 (tutorial hours arranged).

Political Science 47.498, Honours Graduation Essay

Day Division: tutorial hours arranged.

The following Fourth year courses, offered by other Departments may, with the approval of the Department, be counted as Political Science courses for degree requirements:

Public Law 51.450, *Constitutional Law*
Public Law 51.455, *International Law*

Graduate Courses

Fourth year honours students may, with permission of the Department, be admitted to these seminars.

Political Science 47.500, Provincial and Municipal Government

Problems of government and administration, and of inter-governmental relations. Guest experts participate from time to time.
Day and Evening Divisions: 1968-69 (seminar three hours a week).
R. O. MacFarlane and H. B. Mayo

Political Science 47.505, Comparative Government

A research seminar dealing in the first term with theories, methods and problems of comparison, and in the second with particular themes.
Day Division: 1968-69 (seminar three hours a week).
C. Ake

Political Science 47.510, The Political Process in Canada

An analytical study of the democratic political process, with particular reference to political parties and elections, pressure groups, public opinion, and political leadership in Canada.
Day Division: 1968-69 (seminar three hours a week).
K. Z. Paltiel

Political Science 47.515, Problems in Communist Politics

A research seminar in selected problems in the politics, government, and society of Communist political systems (the Soviet Union, Eastern Europe and the Asian Communist states). In 1968-69 the emphasis will be on the decision-making process and the operation of social and economic restraints.
Day and Evening Divisions: 1968-69 (seminar three hours a week).
T. R. Harmstone

Political Science 47.520, Nationalism

The general problem of nationalism, its current manifestations, and the attempts to contain and institutionalize its expression. The second part deals with the special problems of plurilingual societies, including Canada.
Day and Evening Divisions: 1968-69 (seminar three hours a week).
K. Z. Paltiel and K. D. McRae

Political Science 47.525, Problems in American Government

Selected issues of constitutional growth and interpretation; co-operation and conflict in decision-making; recent developments in the Presidency, Congress, electoral behavior, public opinion analysis.
Day Division: 1968-69 (seminar three hours a week).
J. Alexander

Political Science 47.530, Analytical Political Theory

The role of theory in the study of politics and the major concepts used in political analysis. The possibilities and limitations of the historical, institutional, functional, behavioural, and general systems approaches. Attention will also be paid to problems of research methodology, including hypothesis formation, application of theorems, and conceptual frameworks, and to problems of proof and interpretation.
Day Division: 1968-69 (seminar three hours a week).
W. A. Mullins

Political Science 47.532, Selected Topics in Political Theory

A seminar on selected areas or problems of political theory. The content of this course may change from year to year; for 1968-69 the topics will centre upon the relations between philosophy and politics.
Day Division: 1968-69 (seminar three hours a week).
H. B. Mayo

Political Science 47.535, The Canadian and American Political Traditions

Day Division: 1968-69 (seminar three hours a week).
K. D. McRae

Political Science 47.540, Theory and Practice of Administration

Student reports on specific topics will be presented and discussed. Senior government officials take part in the seminar regularly.
Evening Division: 1968-69 (seminar three hours a week).
R. O. MacFarlane

Political Science 47.545, Comparative Public Administration

The comparative approach to the study of administration; a comparison of public administration under various systems of democratic government, particularly in Europe and the English-speaking world.
Day and Evening Divisions: 1968-69 (seminar two hours a week).
G. B. Doern

Political Science 47.560, Canada in World Affairs

Canada's external relations with special emphasis on the period since 1939.
Day and Evening Divisions: 1968-69 (seminar three hours a week).
N. A. Robertson

Political Science 47.565, American Foreign Policy

The foreign policy of the United States with special emphasis on trends since the second world war.
Not offered, 1968-69.

Political Science 47.570, Soviet Foreign Policy

The foreign policy of the Soviet Union; for this year emphasis will be on Soviet-American relations since the second World War.
Day and Evening Divisions: 1968-69 (seminar three hours a week).
Adam Bromke

Political Science 47.580, Africa and Asia in World Affairs

The external relations of African and Asian states.
Day Division: 1968-69 (seminar three hours a week).
T. R. Harmstone and E. L. Tepper

Political Science 47.585, Contemporary International Politics

A seminar on selected problems. In 1968-69 the emphasis will be on recent strategic theory.
Day and Evening Divisions: 1968-69 (seminar two and a half hours a week).
A. Buchan, H. von Riekhoff

Political Science 47.590, Tutorial in a Selected Field

Members of the Department are prepared to give tutorials or reading courses on Political Behavior, Arms Control, Comparative Federalism, and on the government and politics of the following countries or areas: Britain, Western Germany, the Middle East, or Africa South of the Sahara.
Day Division: 1968-69 (tutorial hours arranged).

Political Science 47.598, Research Essay

For students who write a research essay rather than a thesis.
Day and Evening Divisions: 1968-69 (tutorial hours arranged).

Political Science 47.599, M.A. Thesis

Day and Evening Divisions: 1968-69 (tutorial hours arranged).

Political Science 47.699, Ph.D. Thesis

Day Division: 1968-69 (tutorial hours arranged).

The following Fifth year courses, offered by other Departments may, with the approval of the Department, be counted as Political Science courses for degree requirements:

Public Law 51.550, *Administrative Law*

Sociology 53.540, *Political Sociology*

See also:

Economics 43.220, Statistical Methods in the Social Sciences

Economics 43.335, Political Economy in the Modern State

Economics 43.340, Problems of Area Development

Economics 43.430, Industrial Organization and Public Policy

Economics 43.440, Public Finance

Economics 43.450, Economic Fluctuations and Stabilization Policy

Geography 45.440, Political Geography

History 24.231, History of Canada

History 24.260, Modern Russia

History 24.380, An Introduction to the History of International Relations, 1900-1939

History 24.535, Canada Since 1867

Sociology 53.200, Social Research

Sociology 53.300, Sociological Theory

Sociology 53.320, French Canadian Society

Sociology 53.440, Complex Social Systems

Sociology 53.525, Canadian Society

Psychology

Professor; Chairman of the Department	R. A. Wendt
Associate Professors	Marjorie N. Donald (on leave of absence 1968-69), Marilyn E. Marshall, P. D. McCormack, T. J. Ryan, L. H. Strickland, W. E. Walther, D. W. Zimmerman
Visiting Associate Professor	Peter Krausser
Assistant Professors	D. K. Bernhardt, Elinor J. Burwell, P. A. Fried, R. D. Hoge, A. B. Laver, A. J. Ray, Jr., H. M. Simpson, T. N. Tombaugh, R. B. Wells
Sessional Lecturer	Jo Tombaugh, F. R. Wake (St. Patrick's College)
Pre-School Director	Evelyn Gripton
Senior Technician	H. Burgmann

To practice psychology as a profession, to teach psychology, or to conduct psychological research, a graduate degree (usually the Ph.D.) is either customary or, in several provinces, including Ontario, and in most of the United States, required by law. The honours programs in psychology are designed to provide adequate preparation for graduate studies leading to a career as a psychologist, whatever the student's area of interest.

Major Program in Psychology

This alternative is intended for the student who is not planning a career as a psychologist, but who wishes a liberal arts education with several courses in psychology. The minimum requirement for a concentration in psychology is six courses, including Psychology 49.100, usually taken in the first year of the three-year B.A. program, and Psychology 49.300, usually taken in the third year. The student may select any other four courses in psychology for which he has the prerequisites.
The total number of courses in psychology credited for the Pass B.A. degree must not exceed seven.
Students who decide to train for a career as a psychologist are advised to transfer to the honours program not later than the end of the second year. Students who are considering this possibility should choose courses that are required for honours psychology students in the second year.

Part-time Students

Part-time students taking courses in psychology are expected to register as degree candidates. The Department cycles courses in psychology in evening and summer school sessions so that a part-time student may complete a B.A. with concentration in psychology in the shortest possible time.

Honours Programs in Psychology

The honours programs in psychology provide students who are preparing for graduate studies in psychology with an opportunity to learn and evaluate the foundations of the science. The program leading to the B.Sc. with Honours in Psychology is intended for students whose Grade 13 or qualifying year subjects included two experimental sciences (chosen from biology, chemistry, and physics) and mathematics (algebra and geometry and trigonometry, or Mathematics A and B, or Mathematics 69.010 and 69.011). The appropriate honours program in psychology for other students with Grade 13 or qualifying year standing (including Mathematics A or Mathematics 69.010) is that leading to the B.A. degree.

With the permission of the Honours Adviser, Department of Psychology, a student registered in an honours program in psychology may take six courses in any year, if he has the required minimum grade.

B.Sc. with Honours in Psychology

First Year
Course requirements for the First year of a B.Sc. program are set out on p. 72. Psychology 49.100 should be taken as the First year course in the humanities or social sciences. One course must be taken in each of Biology and Chemistry and Physics.

Second Year
1. Psychology 49.205, or Mathematics 69.215* and 69.257*, or Mathematics 69.250. (Students planning to take further courses in Mathematics should select Mathematics 69.215* and 69.257*.)
2. Psychology 49.305.
3. Psychology 49.250, or 49.270, or 49.350.
4. A course in the humanities or social sciences other than Psychology.
5. A course in Biology, or Mathematics, or Chemistry, chosen with approval of the Department of Psychology.

Third Year
1. Psychology 49.220* and 49.221*.
2. Psychology 49.270, or 49.320, or 49.380.
3. Optional course.
4. As for Second Year (4).
5. As for Second Year (5).

Fourth Year
1. Psychology 49.420, or 49.450, or 49.470.
2. Psychology 49.405, or option in Psychology, if Mathematics 69.357* and 69.358* were taken in Third year or are being taken in Fourth year.
3. Psychology 49.300.
4. Psychology 49.498.
5. As for Second year (5).

Note
Second, Third, and Fourth Year courses in Biology, Chemistry, and Mathematics should ordinarily be selected from
a) Biology 61.205, 61.215, 61.340, 61.360, 61.375, 61.435, 61.455.
b) Mathematics 69.205* and 69.245* (200), 69.201, 69.350, 69.357* and 69.358*, 69.453.
c) Chemistry 65.100, 65.210, 65.220, 65.320.

B.A. with Honours in Psychology

First Year
Course requirements for the First year of a B.A. program are set out on p. 50. Psychology 49.100 should be taken as the First year introduction to society. The mathematics or science option should be one of Mathematics 69.100 or 69.101 or Biology 61.100 or 61.205, or 61.215, or Physics 75.010, or 75.100, or 75.105, or Chemistry 65.010, or 65.100, or Science 60.100.

Second Year
1. Psychology 49.205, or Mathematics 69.215* and 69.257*, or Mathematics 69.250, or Economics 43.220. (Students planning to take a sequence in Mathematics should select Mathematics 69.215* and 69.257*).
2. Psychology 49.305.
3. One of Psychology 49.210, 49.220* and 49.221*, either 49.250 or 49.350, 49.270.
4.
and } Two optional courses.
5.

Third Year
1. Psychology 49.220* and 49.221* (or optional course in psychology if these half-courses were taken in Second year).
2. Psychology 49.300.
3. One of Psychology 49.210, either 49.250 or 49.350, 49.270.
4.
and } Two optional courses.
5.

Fourth Year
1. Psychology 49.410, or 49.420, or 49.450, or 49.470.
2. Psychology 49.498.
3.
4.
and } Three optional courses.
5.

Notes:
1. A student registered in the four-year B.A. program with Honours in Psychology may, on request, graduate at the end of the third year of studies, as a B.A. with a sequence in psychology. (See page 47). He must present standing in Psychology 49.100, 49.205, 49.300, and 49.305.
2. A student in a B.A. program with Honours in Psychology must obtain each year the approval of the Department of Psychology for the courses he has selected (including optional courses) before he may complete registration.
3. Optional courses may be in psychology, or any other subject.

Graduate Studies

Degree Programs
The Department offers graduate training in general experimental psychology. Areas of specialization available to the student are determined by graduate course offerings, and the interests and specialities of the staff of the Department. No clinical or other applied programs are offered. Part-time graduate studies are not permitted.

M.A. Program
As qualification for admission to the Final Year, a student must offer standing in: one course in each of statistics and design of experiments, experimental psychology, learning or motivation, physiological and/or comparative psychology, history and/or systems, and two or three other courses in psychology. A student entering with the equivalent of an Honours B.A. or B.Sc. in psychology will be admitted to the final M.A. year (six half-courses and thesis). Not more than one undergraduate course in psychology may be substituted for two half courses.
Students with less than an Honours B.A. or B.Sc. will be admitted to a Qualifying year designed to bring them to the level of an Honours degree student.

Ph.D. Program

The qualification for admission into the Ph.D. program is a Master's degree in psychology, or equivalent. The student must complete at least two years of full-time formal study and research beyond the Master's degree.

If the 49.405 requirement has already been met, the first Ph.D. year will consist of eight optional half-courses. The second Ph.D. year will consist of four half-courses and 49.699. Ordinarily, optional courses for Ph.D. students will be at the 500 and 600 levels. Students may be encouraged to take supporting undergraduate courses in psychology, or courses in other subjects.

Special Degree Requirements

A student must obtain a minimum grade of 66% or better in *each* course and half-course to be credited towards graduate degree requirements. A student in the Qualifying year must maintain a minimum *average* of 66% in all courses taken in that year.

After the Qualifying M.A. year, a student must work for ten to fifteen hours a week as a teaching or research assistant, as part of his training. The Department will provide support for teaching and research assistants through fellowships, research grants, and stipends.

In addition to satisfying course requirements in his area of specialization, a student must demonstrate competence in statistics, experimental design, and research methods. As his field of concentration demands, he will be required to demonstrate, to the satisfaction of his research supervisor, competence in such areas as computer techniques, electronics, psychometrics, sampling procedures, surgical techniques, or reading comprehension in foreign languages.

Ph.D. students must pass comprehensive examinations, usually given at the end of the first full year of study.

Psychology 49.100, Introductory Psychology

The biological basis of and variables affecting individual differences, learning, motivation, sensation, and perception. Methodology and experimentation are stressed as central to the scientific study of behavior. Students are required to assist in research projects as subjects.

Text: Vernon (Ed.), *Introduction to Psychology*.
Day and Evening Divisions: Lectures two hours a week, laboratory two hours a week.
W. E. Walther

Psychology 49.205, Statistics

Descriptive statistics (frequency distributions, measures of central tendency and variability), probability (binomial and normal distributions), inference (z and t distributions, tests of hypotheses about means and differences between means in large and small samples), regression, correlation (Pearson r and other correlation methods), simple analysis of variance, non-parametric statistics. (A student may not obtain more than one credit for Psychology 49.205, Sociology 53.205, Economics 43.220, Mathematics 69.250, and Mathematics 69.215* and 69.257*).

Text: Freund, *Modern Elementary Statistics,* 2nd edition.
Prerequisite: Psychology 49.100 for Psychology Majors and Honours Students; permission of instructor for others. (Students weak in elementary mathematical skills should study Walker, *Mathematics Essential for Elementary Statistics*).
Day Division: Lectures three hours a week.
P. D. McCormack

Psychology 49.210, Social Psychology I (Introduction to Social Psychological Processes)

An introduction to social processes, including social perception, motivation and attitudes; norms and role behaviors; communication and interaction; group structures and properties. (This course is also listed as Sociology 49.210).
Text: McDavid and Harari, *Social Psychology*.
Prerequisite: Psychology 49.100 or Sociology 53.100.
Day Division: Lectures three hours a week.
R. D. Hoge and R. B. Wells

Psychology 49.220*, Physiological Psychology

An introduction to the physiological substrates of behavior.
Texts: Woodburne, *The Neural Basis of Behavior;* Strange and Foster, *Readings in Physiological Psychology*.
Prerequisite: Psychology 49.100.
Day Division: Lectures three hours a week, first term.
H. M. Simpson

Psychology 49.221*, Comparative Psychology

An introduction to the development of behavioral capacity from uni-cellular organisms to man.
Text: Ratner and Denny, *Comparative Psychology*.
Prerequisite: Psychology 49.220*.
Day Division: Lectures three hours a week, second term.
A. J. Ray

Psychology 49.250, Developmental Psychology I (Child Psychology)

The growth and development of the child from birth to adolescence. Emphasis is on those processes in early childhood that affect later functioning.
Text: McCandless, *Children;* Mussen, Congor and Kagan, *Readings in Child Development and Personality*.
Prerequisite: Psychology 49.100.
Day Division: Lectures three hours a week.
Elinor J. Burwell

Psychology 49.260, Theories of Personality

Theories of personality, with consideration of processes of normal and abnormal behavior. Introduction to techniques of personality evaluation which serve as indicators of normal and abnormal adjustment.
Text: To be announced.
Prerequisite: Psychology 49.100.
Day Division: Lectures three hours a week.
D. K. Bernhardt and R. B. Wells

Psychology 49.270, Learning I (Theories of Learning)

The nature of psychological theories. Survey of contemporary learning theories and their significance in the history of experimental psychology.
Texts: Hilgard and Bower, *Theories of Learning;* Holland and Skinner, *The Analysis of Behavior.*
Prerequisite: Psychology 49.100.
Day Division: Lectures three hours a week.
A. B. Laver

Psychology 49.300, History of Psychology

The growth of psychology as a science. Emphasis is on the treatment of persisting psychological problems in theories of the past, and the continuing significance of these problems in modern systematic theory.
Texts: Boring, *History of Experimental Psychology;* Herrnstein and Boring, *Readings in the History of Experimental Psychology.*
Prerequisite: Psychology 49.100. Open to Third or Fourth Year students only (or permission of the instructor).
Day Division: Lectures three hours a week.
Marilyn E. Marshall, A. B. Laver and Peter Krausser

Psychology 49.305, Experimental Psychology

An introduction to psychological research, including an examination of methods, theories, and preparation of reports. A number of experiments will be carried out in the laboratories. An independent research project is a major requirement in the second term.
Texts: McGuigan, *Experimental Psychology*, 2nd edition.
Prerequisite: Psychology 49.205 (may be taken concurrently).
Day Division: Lectures two hours a week, laboratory two hours a week.
H. M. Simpson and T. N. Tombaugh

Psychology 49.320, Sensation and Perception

The physiological bases of sensation and perception and their relation to the basic psychological phenomena encountered in vision, audition, olfaction, gustation, and other senses, with emphasis on relevant experimental procedures and techniques of data analysis. Philosophical and historical development of perceptual theory, and an examination of selected contemporary problems and research.
Texts: Dember, *The Psychology of Perception;* Mueller, *Sensory Psychology.*
Prerequisite: Psychology 49.100.
Day Division: Lectures three hours a week.
P. A. Fried

Psychology 49.330, Differential Psychology

A critical review of the evidence respecting human differences from psychometric and experimental studies. Group differences associated with class, age, race, nationality, and sex; and individual differences as to aptitude, interest, achievement, and personality.
Day Division
Not offered, 1968-69.

Psychology 49.335, Psychometrics

An introduction to the measurement of human behavior, dealing with theories of psychological testing and their application to problems of experimental psychology.
Text: Helmstadter, *Principles of Psychological Measurement*.
Prerequisite: Psychology 49.205.
Day Division: Lectures three hours a week.
D. W. Zimmerman

Psychology 49.340, Personnel Psychology

Application of psychological theory and techniques to problems of organizational functioning and worker motivation. (Open to Pass B.A. and B.Comm. students only).
Texts: Gilmer, *Industrial Psychology*, 2nd edition; Karn and Gilmer, *Readings in Industrial and Business Psychology*.
Prerequisite: Psychology 49.100.
Day Division: Lectures three hours a week.
R. D. Hoge

Psychology 49.350, Developmental Psychology II (Adolescence and Maturity)

Psychological growth and development from adolescence through maturity.
Text: To be announced.
Prerequisite: Psychology 49.100.
Day Division: Lectures three hours a week.
Elinor J. Burwell

Psychology 49.360, Abnormal Behavior

History of the concept of behavioral abnormality. Theory and selected research dealing with the nature and etiology of behavioral abnormality.
Text: To be announced.
Prerequisite: Psychology 49.250 and permission of instructor.
Day Division: Lectures three hours a week.
D. K. Bernhardt

Psychology 49.380, Motivation

A survey of the effects of motivational variables on performance, learning, and perception, in animals and man. Contemporary theories of motivation.
Day Division.
Not offered, 1968-69.

Psychology 49.405, Advanced Statistical Methods

The statistics of experimental design, including simple and complex analysis of variance, orthogonal polynomials, and analysis of covariance.
Text: Edwards, *Experimental Design in Psychological Research*, 3rd edition.
Prerequisite: Psychology 49.205.
Day Division: Lectures three hours a week.
D. W. Zimmerman

Psychology 49.410, Social Psychology II (Theory and Method)

Classical theories of social psychology, and contemporary research developments. Attitude scaling, survey techniques, and group observation.
Text: Jones and Gerard, *Social Psychology;* selected readings.
Prerequisite: Psychology 49.210.
Day Division: Lectures three hours a week.
L. H. Strickland

Psychology 49.420, Advanced Physiological Psychology

Examination of classical and recent findings on the role of the nervous system in sensory experience, motivation, and learning. Techniques and phenomena of electrophysiology, central stimulation, ablation, spreading depression, and psychopharmacology will be treated in laboratory demonstrations or exercises.
Text: Thompson, *Foundations of Physiological Psychology.*
Prerequisites: Psychology 49.220* and 49.221* and Biology 61.205.
Day Division: Lectures three hours a week.
P. A. Fried

Psychology 49.450, Experimental Child Psychology

Seminar on various theories of human development and related research. Students will be required to evaluate and replicate research methods used in selected studies.
Text: To be announced.
Prerequisite: Psychology 49.250 or 49.350.
Day Division: Seminar hours to be arranged.
T. J. Ryan

Psychology 49.470, Learning II (Empirical Foundations of Learning)

Specification of empirical variables relevant to classical and simple instrumental conditioning situations. Empirical relations between these variables and theoretical structures elaborated in an attempt to account for their derivation. Capacity of such theories to generate hypotheses about more complex learning phenomena.
Text: Hall, *The Psychology of Learning.*
Prerequisite: Psychology 49.270.
R. A. Wendt and T. N. Tombaugh

Psychology 49.498, Thesis for Honours in Psychology

Candidates for honours in psychology will present a thesis, at the end of the fourth year, based on an experimental investigation.
Day Division: Tutorial hours to be arranged.
A. B. Laver and Members of the Department

Graduate Courses

Except where noted below, the prerequisite for registering in any M.A. course is registration in the M.A. or Ph.D. program *and* permission of the instructor. Not all courses will be given each year. However, courses will be cycled so that all will be offered within a three-year period.

Psychology 49.500*, Systems of Psychology

An examination of selected psychological systems and theories of the late 19th and 20th centuries within the context of the substance and philosophy of science, and theories of knowledge.
Day Division: First Term.
Peter Krausser

Psychology 49.501*, Problems in the History of Psychology

Aspects of specific problems important in current psychology are examined in historical context to determine how the problems were approached in the past and how selected individuals contributed to an understanding of the problems.
Day Division: Second Term.
A. B. Laver

Psychology 49.502*, Child Psychology in Historical Perspective

The characteristics of man from prehistoric times, as reflected in child-rearing practices and the development of children.
Day Division: First Term.
F. R. Wake

Psychology 49.505*, Research Methods

Research methods common to all fields of psychology. Topics will include empirical approaches, apparatus and instrument selection, selection of subjects and response measures, data processing and computer techniques. A required course.
Day Division: First Term.
A. J. Ray and Members of the Department

Psychology 49.510*, Research Methods in Social Psychology

Exposure to and experience with selected research and data analysis techniques of particular relevance for social psychology. Attention is given to sampling, computer analysis of survey data, interaction process analysis, sociometric measurement.
Prerequisite: Psychology 49.505*.
Day Division: Second Term.
L. H. Strickland

Psychology 49.511*, Theoretical Foundations of Contemporary Social Psychology

Historically important theories of different types and levels developed in relation to significant issues in social psychology. Consideration is given to important research generated from these theories.
Day Division: First Term.
R. B. Wells

Psychology 49.512*, Cognitive Processes in Social Psychology

An examination of current research and theory within the cognitive area. Emphasis will be placed on those processes which are affected by social factors. Specific topics might include language development, the relation between thought and language, and concept formation.
Day Division: Second Term.
R. D. Hoge

Psychology 49.513*, Attitude Structure and Change

An examination of current research and theory with respect to attitudes. Emphasis will be placed on methodological problems within the area.
Day Division.
Not offered, 1968-69.

Psychology 49.514*, Social Perception

The development and current status of such areas as (a) socially derived determinants of perception, (b) the perception of persons in the interaction context, and (c) mathematical models of the perception-cognitive process. Both substantive and methodological issues are stressed.
Day Division.
Not offered, 1968-69.

Psychology 49.515*, Small Groups

Detailed examination of currently important topics in small-group theory and research, e.g., group problem solving, group risk-taking, interaction in the dyad and its relation to learning theory, etc.
Day Division
Not offered, 1968-69.

Psychology 49.516*, Complex Organizations

Social behaviour of members in extra-laboratory, structured social contexts is examined. Also, attention is given to situations where the organization is itself the unit of analysis.
Day Division.
Not offered, 1968-69.

Psychology 49.520*, Foundations of Physiological Psychology

The anatomical, methodological, neurophysiological and philosophical foundations of physiological psychology. Specific study will then be given to selected neural systems including the emotion/motivation system, the reticular activating system, and the visual system.
Day Division: Second Term.
Not offered, 1968-69.

Psychology 49.521*, Central Nervous System and Behavior

Selected topics in physiological psychology. Among these topics will be: consolidation and memory, interhemispheric transfer, electrophysiology of learning, and current physiological theories of learning and behavior.
Day Division.
Not offered, 1968-69.

Psychology 49.525*, Animal Behavior

A study of the non-plastic and innate modes of adaptation including kineses, taxes, instincts and other innate response patterns. Related topics such as the influence on behavior of special sensory apparatus or morphological characteristic will also be discussed.
Day Division: First Term.
A. J. Ray

Psychology 49.526*, Comparative Psychology

Variable and acquired adaptive mechanisms and their phylogenesis. Topics will include: attachment behavior, social organization, learning abilities, communication and motivation.
Day Division.
Not offered, 1968-69.

Psychology 49.527*, Psychophysiology

Basic concepts, principles, and methods in psychophysiology with emphasis on the physiological correlates of cognitive processes.
Day Division.
Not offered, 1968-69.

Psychology 49.528*, Methods and Instrumentation in Physiological Psychology

Electrode fabrication, stereotaxic procedures, including electrode and cannulae implants, lesion techniques, electrical stimulation of the brain, recording brain potentials, data analysis, including frequency and wave-form analysis, and techniques of neur-histology will be considered in lectures and practiced in the laboratory.
Prerequisite: Psychology 49.505*.
Day Division: Second Term.
A. J. Ray

Psychology 49.530*, Sensory Processes

Neuroanatomy and neurophysiology of receptor systems and the related integrative action of the central nervous system. Current theoretical models of sensory function.
Day Division.
Not offered, 1968-69.

Psychology 49.531*, Perception

Modern perceptual theory illustrated by intensive review of contemporary empirical studies.
Day Division.
Not offered, 1968-69.

Psychology 49.540*, Measurement

Physical, psychophysical, and psychological measurement. The mathematical equation as a statement of relation between two metricised variables. Curve fitting as a method of deriving such equations from empirical data. Goodness of fit, trend differences and applications of equations in theory construction.
Day Division.
Not offered, 1968-69.

Psychology 49.541*, Mathematical Models

The formulation, development, and experimental application of a number of mathematical models in psychology. Most of the required mathematical techniques will be developed rather than assumed so that formal derivations can be understood by a student with a good preparation in algebra.
Day Division: First Term.
Jo Tombaugh

Psychology 49.542*, Correlational Techniques

Product moment correlation, linear and non-linear regression, point coefficients and other measures of association, partial correlation, multiple correlation, canonical correlation, multiple discriminant analysis, factor analysis.
Day Division: Second Term.
Jo Tombaugh

Psychology 49.545*, Psychometric Methods

Seminar on representative psychological tests with emphasis on construct validity, use in research, and on theories which guided their development. Students will be trained in the administration and interpretation of selected individual tests.
Day Division.
Not offered, 1968-69.

Psychology 49.550*, Research Methods in Child Development

Review and evaluations of widely used research techniques in the study of child behavior. Research methods that require special knowledge or modification when used with children will be emphasized. Laboratory practice will help students to acquire research skills.
Prerequisite: Psychology 49.505*.
Day Division: Second Term.
T. J. Ryan

Psychology 49.551*, Theories of Child Development

Diverse major, theoretical positions will be presented and evaluated in terms of research findings.
Day Division: First Term.
T. J. Ryan

Psychology 49.552*, The Psychology of Early Childhood

Behavioral development during the early stages in acculturation. Topics will include sensory and perceptual processes, motor development, learning, cognitive, social and emotional development.
Day Division.
Not offered, 1968-69.

Psychology 49.553*, The Psychology of the Exceptional Child

A critical examination of current research with exceptional children, to include the culturally disadvantaged, emotionally disturbed, and brain damaged, as well as the highly creative and highly intelligent.
Day Division: Second Term.
Elinor J. Burwell

Psychology 49.561*, Contemporary Research in Personality

Current controversial issues in personality research and selected research studies in personality development and theory.
Day Division: First Term.
D. K. Bernhardt

Psychology 49.570*, Research Methods in Learning

Experimental methods, research design, and instrumentation in the fields of learning, and retention. Emphasis on response definition and measurement, procedures and equipment for monitoring and recording the learning process, instructions, and problems of control.
Prerequisite: Psychology 49.505*.
Day Division: Second Term.
T. N. Tombaugh

Psychology 49.571*, Classical Conditioning

A comparative review of appetitive and aversive Pavlovian conditioning from its inception to current North American and Russian research.
Day Division.
Not offered, 1968-69.

Psychology 49.572*, Instrumental Conditioning

Variables affecting the acquisition, performance, and extinction of free and discrete operant behaviors.
Day Division.
Not offered, 1968-69.

Psychology 49.573*, Generalization and Discrimination

Variables which influence stimulus and response generalization, generalization gradients, and the acquisition of different responses to different stimuli.
Day Division: First term.
Marilyn E. Marshall

Psychology 49.574*, Transfer of Training

Analysis of the facilitating or interfering effects of prior experience upon new learning. Nonspecific as well as specific transfer situations will be included.
Day Division: Second Term.
Marilyn E. Marshall

Psychology 49.575*, Memory and Retention

A study of the literature on the memorizing process, short and long term retention, and analysis of memory research paradigms.
Day Division: First Term.
P. D. McCormack

Psychology 49.576*, Problem Solving and Thinking

Complex problem solving, reasoning processes, thinking, and symbolic behavior.
Day Division.
Not offered, 1968-69.

Psychology 49.580*, Motivation and Emotion

The various conceptual frameworks through which psychologists have attempted to explain motivated behavior. Emphasis will be placed on the empirical delineation of those variables which determine motivated performance and their relation to other phenomenon, e.g., learning, perceptual, physiological. Methodological consideration will be included where appropriate.
Day Division.
Not offered, 1968-69.

Psychology 49.590, Directed Studies

Students may register in this course only under special circumstances. Permission to register and approval of course outline must be obtained from the Graduate Committee.
Day Division.
P. D. McCormack and Members of the Department

Psychology 49.591, Independent Research

Permission to register and approval of research plan must be obtained from the Graduate Committee. This course may be repeated for credit.
Day Division.
Members of the Department

Psychology 49.599, M.A. Thesis

Four half course credits.
Day Division.
P. D. McCormack and Members of the Department

The following Seminars are open only to Ph.D. students

Psychology 49.610*/611* — Social Psychology

L. H. Strickland

Psychology 49.620*/621* — Physiological Psychology

A. J. Ray

Psychology 49.650*/651* — Developmental Psychology

T. J. Ryan

Psychology 49.670*/671* — Learning

P. D. McCormack

Psychology 49.699 — Ph.D. Thesis — 10 half course credits.

P. D. McCormack and Members of the Department

Public Law

Associate Professor;
Chairman of the
Department   R. D. Abbott
Assistant Professors   D. Fraser, J. G. Neuspiel
Sessional Lecturer   M. J. O'Grady

The Department of Public Law does not offer an integrated series of courses leading to a Major or Honours in Public Law. Its courses have been established after consultation with the Department of Political Science, the School of Public Administration and the Committee on Commerce Studies and are intended to complement studies in those fields. Students intending to proceed to a law school should note that no credit is given for these courses toward a law degree. However, prospective law students should find the Elements of Law course, Public Law 51.350, a valuable introduction. Members of the Department are available to advise prospective law students concerning their choice of courses at Carleton University.

Public Law 51.251, Commercial Law

The law of contract and agency, sale of goods, negotiable instruments, partnerships and companies, bankruptcy and insolvency, bills of sale and chattel mortgages, conditional sales, bulk sales, bailment, banking, patents, trade marks and copyright, labour relations and other industrial legislation.
Day Division: Annually (lectures and discussion three hours a week).
D. Fraser

Public Law 51.350, The Elements of Law

A study of the Canadian legal systems, including its concepts, institutions, processes and functions. (See Political Science p. 263).
Prerequisite: Political Science 47.100 or permission of the instructor.
Day Division: Annually (lectures and discussion three hours a week).
R. D. Abbott
Evening Division: Annually (lectures and discussion three hours a week).

Public Law 51.450, Constitutional Law

A study of the nature and limits of executive, legislative, and judicial power in Canada, as interpreted by the courts. The distribution of powers under the Canadian Constitution. (See Political Science p. 265).
Prerequisites: Political Science 47.100 and a further course in Political Science, or permission of the instructor.
Evening Division: Annually (lectures and discussion three hours a week).
J. G. Neuspiel

Public Law 51.451, Company Law

The law relating to corporations and partnerships in Canada; the historical development of the corporate device; rights and duties of officers, directors, and shareholders of the corporation; legal aspects of corporate finance; comparative aspects of corporation law in the U.S., U.K., and Europe.
Evening Division: Annually (lectures and discussion three hours a week).
M. J. O'Grady

Public Law 51.452, Labour Law

Law of employment and of collective agreements; law relating to economic action of employers and employees, especially lockouts, strikes and picketing; union internal relations; related social and welfare aspects, fair employment practices and workmen's compensation.
Evening Division: Annually (lectures and discussion three hours a week).
D. Fraser

Public Law 51.455, International Law

The law concerning relationships among states. Nature and sources of international law. International personality of states; the position of the individual; creation and effect of international obligations; importance and functions of international tribunals in the settlement of disputes. (See Political Science p. 265).
Prerequisite: Political Science 47.260 or permission of the instructor.
Evening Division: Annually (seminar three hours a week).
J. G. Neuspiel

Public Law 51.550, Administrative Law

A study of administrative law in the light of current social and economic problems and relationships and in the light of the trends of modern legislation, with particular reference to Canada. Theories influencing developments in the field; delegated legislative and delegated adjudicative powers, their nature and extent, reasons for delegation, dangers; judicial and extra-judicial review and control; administrative procedure; suggested reforms. (See Political Science p. 268).
Prerequisite: Public Law 51.350 or permission of the instructor.
Evening Division: Annually (lectures and discussion three hours a week).
R. D. Abbott

Religion

Professor	Desmond G. Bowen (Department of History)
Associate Professor; Chairman of the Department	Lawrence M. Read (on leave of absence, 1968-69)
Associate Professors	Robert E. Osborne, Cyril G. Williams
Assistant Professors	Antonio R. Gualtieri, Ronald L. Nettler
Sessional Lecturer	Simon L. Eckstein

The general purpose of courses offered in this department is to promote a sensitive and intellectually mature understanding of the basic ideas and concerns of outstanding religious leaders and movements, primarily in the Judaeo-Christian tradition, irrespective of whether these coincide or conflict with individual convictions. Religious writings are studied critically in an attempt to understand their meaning, to grapple with their problems, and to assess their significance both in their original cultural context and for our own situation.

As general introduction, students are advised to take Religion 34.100 or 34.120 or both. If two or more courses are taken in the department, students are advised to make Religion 34.120 one of these. In 1968-69, except where noted, other courses may be taken without previous work in the department.

Major in Religion

Majors in Religion will take Religion 34.100, Religion 34.120, and at least three other courses in Religion. Special arrangements will be made for students proposing a combined major program. All majors will arrange their programs in consultation with a member of the department.

Religion 34.100, Introduction to World Religions

A survey of eastern religions: Hinduism, Buddhism, Taoism, Confucianism and Shinto. A survey of "western" religions: Zoroastrianism, Judaism and Christianity (brief review of major emphasis only) and Islam. Special attention will be paid to the philosophy of religion and theology of these religions.
Day and Evening Divisions: Annually (lectures and discussion three hours a week).
A. R. Gualtieri, R. L. Nettler and C. G. Williams
Summer: 1968 *Evening Division* (lectures five hours a week).
A. R. Gualtieri

Religion 34.120, Origin and Early Development of Judaism and Christianity

A survey of Judaism and Christianity up to the second century A.D. The early history of Israel, the development of Hebrew literature, major concepts of Hebrew religion, the Torah, the great prophets; Jewish sects and literature in the Hellenistic and early Roman periods, including apocalyptic writings and the Dead Sea Scrolls; the early history of Christianity, the teachings of Jesus and the contribution of source and form criticism to the interpretation of the gospels, the life and teaching of Paul, the Johannine writings, the book of Revelation.
Day Division: Annually (lectures and discussion three hours a week).
Summer: 1968 *Day Division* (lectures ten hours a week).
R. E. Osborne

Religion 34.202, Hindu and Buddhist Texts

A study of some of the great texts (in translation) of Hinduism and Buddhism, including examination of their historical context, analysis of their central religious and philosophical ideas, exploration of their role in shaping and expressing the life of Hindus and Buddhists. The class will usually be conducted in seminar form with emphasis on student discussion and reports.
Prerequisite: Religion 34.100 or permission of the Department.
Day Division: 1968-69 (two hours a week).
A. R. Gualtieri

Religion 34.208, Islam

An introduction to the Islamic religious tradition. A broad historical survey of the entire tradition including a special study of a few of the most important areas. The subjects chosen for special study during the year 1968-69 are the following ones: (1) the life and work of Muhammad; (2) aspects of the Islamic intellectual tradition: philosophy, theology and mysticism; (3) basic religious beliefs and practices of the Muslim peoples. The goal throughout will be to achieve an understanding of the ways in which Muslims have articulated, developed and dealt with the major issues and problems in their religious life.
Prerequisite: Religion 34.100 or permission of the Department.
Day Division: 1968-69 (two hours a week).
R. L. Nettler

Religion 24.211, Cultural and Intellectual History of the Middle Ages

Commencing with a study of patristic thought and institutions, this course will examine the intellectual and cultural development of medieval Europe. (Offered in the Department of History as History 24.211).
Day Division: 1968-69 (three hours a week).
R. E. Reynolds

Religion 24.214, Church, State and Society from the Reformation to the Present

A study of Christian thought and institutions and their influence on the appearance of nation states and on the growth of modern pluralistic society in Europe and America. (Offered in the Department of History as History 24.214).
Evening Division: 1968-69 (three hours a week).
D. G. Bowen

Religion 34.220, The Prophets of the Old Testament

A study of the nature, development and significance of Hebrew prophetism. Psychological aspects of the prophetic experience, including the call, "ecstasy", symbolic actions, and the power of the "word". Investigation of problems such as: the political role of the prophets, relation of the prophets to the cult, distinction of true and false prophets, prediction and fulfillment, compilation of prophetic books. Major attention will be given to the activities and messages of the classical prophets.
Day Division: Alternate years; offered 1969-70 (lectures and discussion two hours a week).
R. E. Osborne

Religion 34.223, Between the Testaments

A study of the period from about 400 B.C. to A.D. 100: the history, movements, ideas crucial to the development of Judaism and Christianity, as documented especially in the writings which were not included in the Bible. Consideration of wisdom literature, apocalyptic writings, historical works and Rabbinical literature. Special attention will be given to the Dead Sea Scrolls.
Evening Division: Alternate years; offered 1969-70 (lectures and discussion two hours a week).
R. E. Osborne

Religion 34.225, The Life and Teachings of Jesus

The course will be concerned with a systematic study of the available records of the life of Jesus. Class periods will be mainly taken up with free class discussions of successive sections of the gospel parallels of Matthew, Mark and Luke. There will be accompanying lectures and readings on the historical context of the life of Jesus and on the milieu within which the records developed.
Day Division: 1968-69 (three hours a week).
R. E. Osborne

Religion 34.230, The Life and Thought of Paul

Paul's relation to the Old Testament, Rabbinic Judaism, and Hellenism; the mission to the Gentiles; the "mysticism" of Paul; central ideas such as justification by faith, predestination, the Holy Spirit, the Church. Consideration of the situation and message of each of Paul's writings.
Evening Division: Alternate years; offered 1968-69 (lectures two hours a week).
R. E. Osborne

Religion 34.240, Judaism and the Jewish People

The first half of the course will survey the history of Judaism and the Jewish People from earliest times to the present day emphasizing the major factors, both external and internal, influencing their development. The Biblical period; prophecy; the second commonwealth; the talmudic era; the golden age in Spain; the medieval Jewish community; the modern period; Zionism; the contemporary scene. The second half of the course will review the basic beliefs and practices of Judaism. The thirteen principles of Maimonides; the Synagogue, its rituals and practices; the Jewish home and family; the Jewish holy days, fasts and festivals, dietary laws; marriage and divorce laws; mourning customs; problems, trends and movements in contemporary Judaism.
Texts: M. Margolis and A. Marx, *A History of the Jewish People.*
Isidore Epstein, *Judaism.*
Evening Division: 1968-69 (lectures two hours a week).
S. L. Eckstein

Religion 32.260 (300), Philosophy of Religion

(Offered in the Department of Philosophy as Philosophy 32.260).

Religion 34.280, Trends in Contemporary Theology

A study of the thought of some outstanding twentieth century theologians and a few nineteenth century theologians who strongly influenced them, e.g., Kierkegaard, Schleiermacher, Rauschenbusch, Barth, Bultmann, Tillich, the Niebuhrs, Buber, de Chardin, Bonhoeffer, Cox, the "death-of-God" theologians.
Day Division: Alternate years; offered 1969-70 (lectures and discussions three hours a week).
L. M. Read

Religion 34.330, Religion and Ethics

A study of the ethical teachings of a number of the great world religions with special attention to Judaism and Christianity and an exploration of the implications of these teachings in the context of modern conditions. Students will be asked to choose, individually or in groups, an area of contemporary ethical concern for more intense investigation; e.g. sexual ethics; drug use; Canadian treatment of Indians, Eskimos and other ethnic minorities; Canadian involvement in peace-keeping operations; Canadian external aid; French-Canadian English-Canadian relations and the ethics of nation building; aspects of business ethics; issues of social and economic conflict; social welfare and human rights.
Day Division: 1968-69 (three hours a week).
C. G. Williams

Religion 34.350, Seminar: The Nature and Destiny of Man

With the participation of members of the faculty from the sciences, social sciences, and humanities as well as religion, a critical examination will be made of present and potential contributions of the various disciplines either in conclusions or methodology to an understanding of the nature of man himself and his appropriate destiny.
Prerequisite: Recommendation of a participating member of faculty.
Not offered, 1968-69.

Religion 34.360, Selected Problems in Interpretation

A course conducted either on a tutorial or seminar basis designed to enable advanced students to pursue interests in selected areas of religion.
Prerequisite: Permission of the Department.
Day or Evening Divisions: 1968-69 (hours to be arranged).
Members of the Department

Hebrew 34.015, Introduction to Biblical Hebrew

An introduction to the fundamentals of Hebrew grammar, vocabulary and syntax. Consideration of the history of the Hebrew language and the history of the text of the Old Testament. Readings from selected sections of the Hebrew Old Testament.
Text: J. Weingreen, *A Practical Grammar for Classical Hebrew.*
Not offered, 1968-69.

Russian

Associate Professor;
Chairman of the
Department   G. Melnikov
Assistant Professors   G. R. Barratt, Emilie Stichling, P. Varnai
Sessional Lecturers   G. Belkov, H. van de Lagemaat

Major in Russian

Students may elect Russian as their major, alone or in combination with a suitable subject. A major in Russian consists of a minimum of five courses, excluding Russian 36.015.

Honours Programs

The Honours Program in Russian is designed to give the student a thorough knowledge of Russian language and literature. It consists of nine courses after Russian 36.015.

Combined Honours programs designed to meet the needs of students wishing to teach or go on to graduate work are available in French and Russian, German and Russian, or in other combinations subject to departmental approval. Ordinarily, seven courses in each language of a combination are required. Information about additional requirements may be obtained from the department. General regulations concerning Honours Programs are to be found on pp. 47, 52 and 53. See also p. 182 (French); p. 208 (German). The department participates in the Soviet and East European Studies program. For a description of the program and information on required and optional courses in Russian see p. 67.

The University's language laboratory provides facilities for drill in aural comprehension. Students may take extra practice periods in open hours. The language laboratory is used in the following courses: Russian 36.015, 36.100, 36.201, 36.301. Oral examinations are given in these courses.

Majors in Russian are urged to take History 24.260, or equivalent, as one of their options.

Russian 36.015, Introductory Russian

Introductory course, the aim of which is to ensure an adequate grasp of the mechanics of the language and basic skill in aural comprehension. Reading of texts, and oral practice in the language laboratory.
Texts: Stilman-Harkins, *Introductory Russian Grammar,* and others to be announced.
Day and Evening Divisions: Annually (four hours a week).
Members of the Department
Summer Session: 1968 *Day and Evening Divisions.*

Russian 36.020, Introductory Scientific Russian

This course is designed to meet the needs of all students of the Faculties of Science, Engineering and Graduate Studies of any year who require a reading knowledge of Russian scientific literature. It will include the essentials of Russian grammar, a basic Russian vocabulary and the reading and translation of technical and scientific texts. No language laboratory.
Day and Evening Divisions: 1968-69 (three hours a week).

Russian 36.100, Intermediate Russian

Grammar review; composition; oral drill in the language laboratory. Reading of selected poetry and prose.
Prerequisite: Russian 36.015, or equivalent.
Day and Evening Divisions: Annually (four hours a week).
Members of the Department
Summer Session: 1968 Day Division.

Russian 36.110, Intermediate Scientific Russian

This course is designed for students wishing to improve their command of scientific Russian. It will include a review of Russian grammar and the reading and translation of advanced technical and scientific texts.
Prerequisite: Russian 36.020 or equivalent.
Not offered, 1968-69.

Russian 36.201, Conversation and Composition

Extensive discussion in Russian; translation into Russian; prose composition; essay writing.
Prerequisite: Russian 36.100, or equivalent.
Day or Evening Division: Annually (four hours a week).
Emilie Stichling

Russian 36.250, Nineteenth Century Literature

The emphasis is on prose up to the death of Chekhov, but attention is also paid to the poetry and drama of the period.
Prerequisite: Russian 36.100, or permission of instructor.
Day or Evening Division: Annually (four hours a week).
P. Varnai

Russian Literature in Translation 36.260, Literature of the 19th and 20th Centuries

A study of selected works of Russian and Soviet literature in the general context of European Literature and against their social and political background. It will comprise works by Pushkin, Lermontov, Gogol, Turgenev, Goncharov, Leo Tolstoy, Dostoevsky, Saltykov-Shchedrin, Chekhov, Gorky, A. Tolstoy, L. Leonov, K. Fedin, M. Sholokhov, Paustovsky, Ehrenburg, Pasternak.
This course is designed as an Arts option for all students wishing to broaden their general knowledge of literature. It will not count as a credit for majors in Russian and Soviet Studies.
No Prerequisite.
Day or Evening Division: 1968-69 (two hours a week).

Russian 36.301, Advanced Conversation and Composition

Extensive discussion in Russian; translation into Russian; advanced prose composition and essay writing, with emphasis on stylistics.
Prerequisite: Russian 36.201, or equivalent.
Day or Evening Division: Annually (four hours a week).
Emilie Stichling

Russian 36.320, Russian Poetry

Emphasis is on poets of the nineteenth and twentieth centuries.
Prerequisite: Russian 36.100, or permission of the instructor.
Day or Evening Division: 1968-69 (three hours a week).
G. R. Barratt

Russian 36.330, Soviet Russian Literature

A survey of Soviet Russian literature since 1917, with special emphasis on the novel and short story.
Prerequisite: Russian 36.100, or permission of the instructor.
Day or Evening Division: 1968-69 (three hours a week).
G. Melnikov

Russian 36.340, Russian Drama

The evolution of Russian drama up to the Soviet theatre. Study of dramatic genres through their principal representatives.
Prerequisite: Russian 36.100, or permission of the instructor.
Day or Evening Division.
Not offered, 1968-69.

Russian 36.350, The Russian Novel

A study of the rise of the Russian novel in the nineteenth century.
Not offered, 1968-69.

Russian 36.360, Russian Literature up to Pushkin

Survey of the Kievan and Muscovite periods. Detailed study of eighteenth century prose and poetry.
Not offered, 1968-69.

Russian 36.415, History of the Russian Language

Not offered, 1968-69.

Russian 36.490*, Special Subject

Tutorial on topics of Russian literature to be assigned by the instructor in consultation with the student.
Day Division: 1968-69.
Members of the Department

Russian 36.491, Tutorial

As above, but offered for full-course credit with a corresponding enlargement of scope and assignments.

Russian 36.499, Honours Essay

An option for final-year honours students.

Attention is directed to the program and courses in Comparative Literature described on p. 69.

*An asterisk attached to a course number indicates a half course.

Sociology and Anthropology

Professor, Chairman of the Department	Francis G. Vallee
Professors	Muni Frumhartz, John Harp, Bruce A. McFarlane
Associate Professors	Rodney K. Crook (on leave of absence, 1968-69), Gertrud Neuwirth, Victor F. Valentine, Donald R. Whyte
Assistant Professors	Hyman Burshtyn, Denis P. Forcese, Charles C. Gordon, Stanley S. Guterman, John R. Hofley, C. Stanley Jones, Kenneth Mozersky, Stephen Richer
Sessional Lecturers	W. N. Irving, B. Leathers
Supervisor of Graduate Studies	Donald R. Whyte
Supervisor of Honours and Majors	John R. Hofley (Sociology) Victor F. Valentine (Anthropology)

Major Course

Sociology

Students who major in Sociology are expected to attain a grade of 60% or better in one of the introductory courses in Sociology or Anthropology. Their program will normally consist of at least six courses in the major field, including an introductory course, 53.200, and 53.300 or 53.305 (which are most appropriately taken in the First, Second and Third years, respectively) and at least one additional course at the 300 level. Final-year students with the requisite standing may be given permission to take a course at the 400 level. It is also expected that some work will be taken in related disciplines, the most important of which are: Economics, Geography, History, Political Science, and Psychology. The whole course program is to be worked out in consultation with the Supervisor of Honours and Majors and the student's departmental adviser.

Anthropology

Students who major in Anthropology are expected to attain a grade of 60% or better in one of the introductory courses in Sociology or Anthropology. Their program will normally consist of at least six courses in the major field including an introductory course, 53,200 and 54,301 (Anthropological Theory to be given 1969-70), which are to be taken in the First, Second and Third years respectively and at least one additional course at the 300 level. Final-year students with requisite standing may be given permission to take a course at the 400 level. It is also expected that some work will be taken in related disciplines such as Economics, Geography, Philosophy, Social Psychology, Art, Geology and Genetics. The whole course program is to be worked out with the student's departmental adviser to ensure that students wishing to follow either the ethnology or physical streams in anthropology are properly informed on which related disciplines are most appropriate.

All courses in sociology and anthropology may be counted toward a degree in either major program, with the exception that courses in archaeology and physical anthropology will *not* be counted as credits for the sociology major.

Combined majors

A major program combining Sociology with another discipline requires a minimum of four Sociology courses including an introductory course in Sociology or Anthropology and either Sociology 53.200 or one of Sociology 53.300 or 53.305. At least two of the four courses must be at the 300 level. The program should be worked out in co-operation with the two departments and may well include other requirements additional to those above.

Honours Courses

Honours programs may be entered from the Honours First year in the Social Sciences (see p. 53) or by transfer from the Major course if the appropriate standing has been attained. Students taking Honours in Sociology are expected to meet the general University regulations governing the degree and to fulfil certain additional requirements depending on the program selected. All honours students must obtain at least 66% in *both* their honours essay (53.498) and honours comprehensives. The essay and the comprehensives will each be considered as a course in determining a student's final standing. The following programs are available:

Sociology
The entire selection of courses is to be worked out in close consultation with the Supervisor of Honours and Majors and the student's departmental adviser. Normally, the requirements consist of:
1. Nine courses in Sociology, including:
a) An introductory course in Sociology or Anthropology, 53.200, 53.300 or 53.305, and 53.498.
b) Sociology 53.205 (may be taken as Psychology 49.205 or Economics 43.220).
c) Four additional courses, at least two of which are at the 300 and 400 levels.
2. A minor consisting of three courses in one of the following: Economics, Geography, History, Philosophy, Political Science or Psychology. (Alternative minors will also be considered).
3. A comprehensive examination at the end of the final year.

Sociology and Political Science
Students intending to enter this program should take an introductory course in Political Science and/or an introductory course in Sociology or Anthropology in the First year. The choice of courses in subsequent years is subject to the approval of the chairmen of the two departments. Normally, the requirements consist of:
1. At least six courses in each of the two disciplines, including:
a) An introductorw course in Political Science, 47,230 or 47,231 and four others to be selected in consultation with the Department of Political Science.
b) An introductory course in Sociology and three or four full courses from among: 53.245, 53.250, 53.300 or 53.305, 53.320, 53.330, 53.340, 53.345, 53.350, 53.420, 53.440*, 53.441*, 53.485* and 53.486*.
c) Either Sociology 53,200 or Political Science 47.270. (If Sociology 53,200 is not selected then Sociology 53.300 or 53.305 is compulsory.)
d) Political Science 47,498 or Sociology 53,498 in the final year.
2. A comprehensive examination at the end of the final year.
3. The language requirements for Honours in Political Science.
    The program will be so arranged that the student may transfer to full honours in either of the two fields at the end of the Third year, if he then wishes to specialize more intensively.
    Consideration will also be given to applications for Combined Honours in Sociology and Economics or in Sociology and another related discipline.
    Honours and combined honours students will not be required to write final-year examinations in their Sociology courses. In deciding the class of Honours degree the Sociology Department will consider the comprehensive examination *results* to be equivalent to a fourth year level course.

Graduate Studies

The Department of Sociology offers studies leading to the degree of Master of Arts. It intends to offer studies leading to the Ph.D. degree starting in 1969-70. A student

wishing to enter the M.A. program must have an Honours degree in Sociology (or its equivalent) with at least second class standing. Otherwise, he will ordinarily be expected to take a qualifying year (of five courses designated by the Department) before being admitted to M.A. candidacy.

A candidate for the M.A. in Sociology will (1) take three graduate seminars within the Department or two graduates seminars and a course at the 400 level, (2) write comprehensive examinations in three selected fields of Sociology, (3) present a thesis, and (4) defend his thesis at an oral examination. Grades of 70% or better must be obtained in all of these. Normally, the student will also be required to have had training—or, in some other way, to demonstrate his competence—in social research and in statistics before completing his program.

Members of the staff are prepared to supervise theses in the following areas:

Ethnic Group Relations   Occupations and Professions
Deviant Behaviour   Political Sociology
Family and Kinship   Social Stratification
Mass Communications   Sociology of Education
Native Peoples of Canada   Sociology of Work
                                          Social Psychology

The general regulations governing graduate studies are set out on pp. 88-90 of this Calendar.

Sociology 53.100, Introduction to Sociology: *General Survey of the Fields of Sociology*

An introduction to the basic principles and concepts of sociological study. An examination of the elements of social structure and of social behaviour — social relations, social groups, cultural norms and values, and institutions — against the background of both simple and complex societies.
Day Division: Annually (lectures and discussion three hours a week).
Evening Division: Annually (lectures and discussion three hours a week).
Summer: 1968 *Evening Division* (lectures and discussion five hours a week).
Summer: 1968 *Day Division* (lectures and discussion ten hours a week).
Members of the Department

Sociology 53.101, Social Issues

An introduction to sociological concepts and perspectives via an examination of select social issues. The course will focus on issues such as race relations, poverty, and automation.
Day Division: 1968-69 (lectures and discussion three hours a week).
Members of the Department

Sociology 53.102, Introduction to Sociology: *The Development of Social Thought*

An introduction to sociology focusing on the development of sociological ideas and theories. Basic concepts will be studied in the context of their historical and theoretical background.
Day Division: 1968-69 (lectures and discussion three hours a week).
Members of the Department

Anthropology 54.110, Introduction to Anthropology

A survey of the major fields of anthropology: prehistory; man's place in nature; types of culture and social organization and their geographical distribution; culture and personality.
Day Division: 1968-69 (lectures, laboratories and discussion three hours a week).
C. S. Jones

Sociology 53.200, Social Research

Lectures, seminars, and exercises in sociological method and the techniques of social research. Special attention is paid to sampling, questionnaires and interviews, observational techniques, sociometry, personal documents, and content analysis.
Prerequisite: Introductory course in Sociology or Anthropology.
Day and Evening Division: Annually (lectures two hours a week, laboratory one hour as required).
D. Forcese, K. Mozersky, S. Richer

Sociology 53.205, Sociological Statistics

A study of descriptive and inferential statistics intended to give a critical appreciation of the use of statistics in social research. The course includes descriptive measures, tests of association and independence, and predictive models; emphasis on non-parametric techniques. Interest permitting, an overview of common advanced methods may be included.
Prerequisite: Introductory course in Sociology or Anthropology.
Day Division: 1968-69 (lectures and discussion two hours a week, laboratory by arrangement).
B. Leathers

Sociology 49.210, Social Psychology

(Offered in the Department of Psychology as Psychology 49.210).

Anthropology 54.225 (53.220), Prehistoric Anthropology, Cultural and Biological Evolution of Man

Takes up the physical anthropology and archaeology of the most ancient peoples, the origin of Man, the development of technology and of complex institutions, and the nature of racial differences from an evolutionary point of view.
Day Division: 1968-69 (lectures two hours a week).
W. N. Irving

Anthropology 54.230, Social Systems of Non-Western Societies

A study of social anthropology with an emphasis on cross-cultural comparisons of a sample of world societies in terms of kinship, political, economic, religious and symbolic systems.
Prerequisite: Introductory course in Sociology or Anthropology or permission of the instructor.
Day Division: 1968-69 (lectures two hours a week).
V. F. Valentine

Sociology 53.240, The Primary Group

An examination of small face-to-face groups and their relationship to the social structure of the larger society. Examples of groups to be covered are children's play groups, juvenile gangs, industrial work groups.
Prerequisite: Introductory course in Sociology or Anthropology.
Not offered, 1968-69.

Sociology 53.241, Kinship, Marriage and the Family

The course will entail a cross-cultural analysis of kinship and kin groups, an examination of the historical development of the family in western society, and a general survey of contemporary family life and its relationship to the total society.
Prerequisite: Introductory course in Sociology or Anthropology or permission of the Department.
Not offered, 1968-69 at the Rideau River campus.

(This course is offered 1968-69 in the Department of Sociology at the St. Patrick's campus as Sociology 08.241).

Sociology 53.245, The Sociology of Work: Occupations and Professions

A study of the sociological aspects of work, with particular emphasis on the historical development and contemporary organization of occupations and professions, career patterns and recruitment; and manpower problems in developed and developing countries.
Prerequisite: Introductory course in Sociology or Anthropology.
Evening Division: 1968-69 (lectures and discussion three hours a week).
B. A. McFarlane

Sociology 53.246, Industrial Sociology

An inquiry into the development, structure and prospects for industrial society, and post-industrial society. This will include an examination of the social processes of industrialization, the relation of industrial institutions to the rest of the society, and of the internal organization of industrial institutions, including problems of management, labor and union relations.
Prerequisite: Introductory course in Sociology or Anthropology or permission of the instructor.
Day Division: 1968-69 (lectures and discussion three hours a week).
C. C. Gordon

Sociology 53.250, Population Problems

A study of the basic principles and concepts of demography and their historical development, an examination of the basic methods and techniques of demographic analysis, and a review of the interrelations among demographic, socio-cultural, economic and political factors and their implications for social change. Some attention will be paid to the development of skills in carrying out demographic research.
Prerequisite: Introductory course in Sociology or Anthropology or permission of the instructor.
Day Division: 1968-69 (lectures and discussion three hours a week).
K. Mozersky

Sociology 53.255, Sociology of Deviance

An analysis of the relation of deviant behaviour to the functioning of social systems: conditions and types of deviance from the institutional order, the evasion of rules, the social roles of deviants, the structure of control, punishment and cure.
Prerequisite: Introductory course in Sociology or Anthropology or permission of the instructor.
Not offered, 1968-69.

Sociology 53.300, Sociological Theory

A study of the development of sociological theory. The various approaches to theory will be examined under the following headings: theory building and research; nature of Man and Society; organicism, evolutionism and neo-evolutionism; social Darwinism, elitism; functionalism; human exchange and utopianism.
Prerequisite: Introductory course in Sociology or Anthropology and Third-year standing.
Day Division: 1968-69 (lectures and discussion three hours a week).
J. R. Hofley

Sociology 53.305, The Sociological Tradition

An examination of the social and intellectual context which has shaped the development and concerns of modern sociology. Particular attention is paid to the works of Marx, Durkheim and Weber and to their subsequent influence on sociological theory and research.
Prerequisite: Introductory course in Sociology or Anthropology and Third-year standing.
Evening Division: 1968-69 (lectures and discussion three hours a week).
G. Neuwirth

Sociology 53.315, Sociology of Education

An examination of education as a social institution, in terms of its relationship to other social institutions, its internal structure and organization, and its effects on the development and growth of the individual as a social being. These will be studied from both a Canadian and comparative perspective.
Prerequisite: Introductory course in Sociology or Anthropology.
Day Division: 1968-69 (lectures and discussion three hours a week).
S. Richer

Sociology 53.320, French Canadian Society

An analysis of the French Canadian way of life, including politics, religion, social structure, cultural values, and literature. Consideration is given both to historical developments and to the contemporary situation.
Prerequisite: Introductory course in Sociology or Anthropology or permission of the instructor.
Day Division: 1968-69 (lectures and discussion three hours a week).
Lecturer to be announced

Sociology 53.340, Conflict and Society

An examination of the dialectics of individual and social phenomena; the bases, manifestations and consequences of conflict in everyday life; ways of eliminating and synthesizing sources of conflict; the strain toward group cohesion and societal integration.
Prerequisites: Introductory course in Sociology or Anthropology and permission of the instructor.
Not offered, 1968-69.

Sociology 53.345, Power and Stratification

A cross-cultural study of relations among political, economic and social power; the theories of elites, oligarchies and ruling minorities; bureaucracy and social power; criteria of social class; social class and behaviour; social mobility; and class, caste and ideology.
Prerequisite: Introductory course in Sociology or Anthropology or permission of the instructor.
Day Division: 1968-69 (lectures and discussion three hours a week).
J. R. Hofley

Sociology 53.350, Political Behaviour

An examination of sociological contributions to the study of political behaviour and of the relations between politics and the social structure. The areas of primary interest include: public opinion, voting and other forms of political participation, the politically relevant aspects of the media of mass communication, and the structure and functions of social and political movements.
Prerequisite: Introductory course in Sociology or Anthropology or permission of the instructor.
Evening Division: 1968-69 (lectures and discussion two hours a week).
S. S. Guterman

Sociology 53.360, Social and Cultural Change

An examination of the conditions which make for changes in social systems. Consideration is given to biological, demographic, economic, technological and sociocultural factors, as well as to evolution and differentiation, culture contact, theories of historical development, and the idea of progress.
Prerequisite: Introductory course in Sociology or Anthropology or permission of the instructor.
Not offered, 1968-69.

Anthropology 54.370, Linguistic and Psychological Anthropology

A review of theory and methods of anthropological linguistics. Emphasis will be on the interdependence among language, culture and certain psychological processes. The study is undertaken on a comparative basis and includes both preliterate and literate groups.
Prerequisite: Introductory course in Sociology or Anthropology.
Day Division: 1968-69 (lectures three hours a week including laboratories and discussions).
C. S. Jones

Sociology 53.400, Sociological Analysis

An examination of the process of formulating research questions, and of selected techniques in the generation and analysis of data.
Prerequisites: Sociology 53.205 or equivalent, final-year Honours standing or permission of instructor.
Day Division: 1968-69 (lectures and laboratory four hours a week).
H. Burshtyn

Sociology 53.410, Personality and Social Structure

This course will examine personality from a sociological standpoint. The major themes will be: the congruence between personality and institutional positions; socialization; personality factors in politics; national character; and personality in social change.
Prerequisite: Final-year Honours standing or permission of the instructor.
Day Division: 1968-69 (lectures and discussion three hours a week).
S. S. Guterman

Anthropology 54.420, Ethnology of Canada

A study of some ethnic groups in Canada including Eskimo, Indian, and Métis. Emphasis will be placed on the social and cultural background of each group, problems of adjustment to changing conditions and current governmental and other programmes designed to meet these problems.
Prerequisite: Final-year Honours standing or permission of the instructor.
Day Division: 1968-69 (seminar two hours a week).
F. G. Vallee

Anthropology 54.430 (53.330), Culture and Communication

A study of animal and human communication (verbal and non-verbal) systems; the relation of these to other social and cultural phenomena. Contrasts between oral and written traditions, between myth in non-literate societies and mass media in urban societies, and the content of contemporary "popular culture" are examined.
Prerequisite: Permission of the instructor.
Day Division: 1968-69 (lectures and discussion three hours a week).
V. F. Valentine

Sociology 53.440*, Complex Organization I

An examination of formal organizations from the standpoint of theories of organization, sociological theories in other fields as they apply to organizations, as well as relevant research.
Prerequisite: Permission of the instructor.
Evening Division: 1968-69 (seminar two hours a week, first term).
C. C. Gordon

Sociology 53.441*, Complex Organization II

An examination of the formal structure and bureaucratic organization of the systems of modern society — industry and work, the labour movement, government and politics, education and leisure.
Prerequisite: Final-year Honours standing or permission of the instructor.
Evening Division: 1968-69 (seminar two hours a week, second term).
V. F. Valentine

Sociology 53.450*, Advanced Research Methodology

A detailed examination of selected methodological problems in social research.
Prerequisite: Sociology 53.200, 53.400 or its equivalent.
Not offered, 1968-69.

Sociology 53.460*, Medical Sociology

Seminar on selected topics in medical sociology. In 1968-69, the focus will be on the sociology of mental illness. Included among the topics examined will be problems in definition, classification and diagnosis; epidemiological methods and the interpretation of epidemiological findings; etiological theories; attitudes towards, and societal reactions to mental illness; therapeutic relationships; mental hospitals as organizations.
Prerequisite: Final-year Honours standing or permission of the instructor.
Day Division: 1968-69 (second term).
H. Burshtyn

Sociology 53.485*, Contemporary Problems of Sociology

Prerequisite: Final-year Honours standing or permission of the instructor.
Not offered, 1968-69.

Sociology 53.486*, Contemporary Problems in Sociology

Prerequisite: Final-year Honours standing or permission of the instructor.
Not offered, 1968-69.

Sociology 53.490* — Sociology 53.491*, Tutorial in Sociology or Anthropology

A course designed to permit a student to pursue his interests in a selected area of Sociology or Anthropology. The student prepares papers as the basis for discussion with his tutor.
This can be taken for one or two terms, either on a single topic or two different topics.
Prerequisite: Final-year Honours standing or permission of the Chairman.
Day and Evening Divisions: Annually (tutorial hours arranged).
Members of the Department

Sociology 53.498, Honours Essay

At the end of the final year an Honours candidate is required to present a major essay based upon a supervised research project. The subject for research is arranged early in the year in consultation with the Department and an adviser is assigned. The student is orally examined upon his essay after its submission.
Prerequisite: Final-year Honours standing.
Day Division: Annually (tutorial hours arranged).
Members of the Department

40.487 Interdisciplinary Research Seminar, Aspects of Urban Studies

(See p. 99 for course description).
K. Mozersky, instructor for Sociology section.

Graduate Seminars

Sociology 53.500*, Seminar in Sociological Theory

An analysis of the central ideas and applications of phenomenology and symbolic interactionism.
Prerequisite: Sociology 53.300 or 53.305 or equivalent.
Day Division: 1968-69 (first term).
D. R. Whyte

Sociology 53.501*, Seminar in Sociological Theory

An analysis of the concepts and applications of systems models in sociology, from early applications to contemporary functionalism.
Prerequisite: Sociology 53.300 or 53.305 or equivalent.
Day Division: 1968-69 (second term).
D. R. Whyte

Sociology 53.505*, The Sociology of Knowledge

An examination of the relationship between ideas and their social context.
Day Division: 1968-69 (first term).
G. Neuwirth

Sociology 53.510*, The Methodology of Theory Construction

The nature of sociological constructs, and the logic of conceptual analysis will be examined.
Prerequisite: Sociology 53.300 or 53.305 or equivalent.
Day Division: 1968-69 (second term).
J. Harp

Sociology 53.520, Comparative Social Systems

Comparative analysis of selected features of Canadian, British, and American social structure.
Day Division: 1968-69.
J. Harp

Sociology 53.525, Canadian Society

An analysis of Canadian social structure and institutions.
Day Division: 1968-69.
B. A. McFarlane

Sociology 53.530*, Social Institutions I

Educational Systems and Organizations
Day Division: 1968-69 (seminar two hours a week, first term).
M. Frumhartz

Sociology 53.531*, Social Institutions II

Selected Problems in the Sociology of Higher Education
Day Division: 1968-69 (seminar two hours a week, second term).
M. Frumhartz

Sociology 53.540, Political Sociology

An examination of the sociological dimensions of power, politics, and political behaviour.
D. Forcese

Sociology 53.585*, Sociology of International Relations

An exploratory application of sociological models to analyses of international relations. This will include an examination of systems models, conflict models, exchange models and simulation models.
Prerequisites: Sociology 53.300 and permission of the instructor.
Day Division: 1968-69 (first term).
D. Forcese

Sociology 53.586*, Selected Topics in Sociology

Sociology of Science and Technology (Tentative)
Day Division: 1968-69 (second term).
B. A. McFarlane

Sociology 53.599, M.A. Thesis

Members of the Department

Spanish

Associate Professor; Chairman of the Department	C. A. Marsden
Associate Professors	F. Atienza, R. L. Jackson, J. Jurado, F. de Toro-Garland
Assistant Professors	R. Larson, A. López-Fernández, J. M. López-Saiz, L. Lorenzo-Rivero
Sessional Lecturers	A. Bégin, P. Bravo, J. Claros, Susan Hendry, Doris Kilbank, Shannon Lorenzo-Rivero, R. Mansoor, Betty Mosión, Nuria Peig, Madeleine Pelletier, Carolyn Stewart, Marjorie Wesche

The Department offers both Pass and Honours courses to majors. Classes are generally conducted in Spanish, and laboratory instruction, compulsory at the 015 and 100 levels, is available to students in the more advanced language courses. Summer reading is set each year.

A list of prescribed texts and supplementary reading for all courses beyond the 100 level is available from the Secretary of the Department.

Courses listed below which begin with 06. are offered by St. Patrick's College and can be taken by students of the Rideau River campus.

Major in Spanish

Interested students must consult with the Department as early as possible to plan their program. General requirements are as laid down on pp. 49 and 50 of the Calendar. A major in Spanish normally consists of five courses after Spanish 38.100 (or 38.101 or 06.132), Spanish 38.210 being compulsory. A combined major will consist of four courses beyond the 100 level. Students who are beginning the study of Spanish at university, and who are considering Spanish as a major, should take note of Spanish 06.132 and 38.101 designed specifically for potential majors. They are also urged to accelerate their progress when possible by taking summer courses. The Department offers each summer Spanish 38.015, 38.100, 38.201*, 38.202*, 38.210, 38.301*, 38.302* and, when required, a reading course.

Honours Course

General regulations concerning Honours courses are to be found on pp. 52 and 53. The Honours course in Spanish is designed to give the student a thorough knowledge of Hispanic language and literature. Lectures and seminars cover the origins and evolution of the language, the principal periods of Spanish and Spanish American literature, and include some study of allied literatures in view of further work at the graduate level. The program consists of nine courses after Spanish 38.015, of which Spanish 38.210 is compulsory. For an explanation of Honours standing see p. 47.

Honours in Spanish and French

This course is designed specifically for the Interim Type A certificate of the Ontario College of Education. Seven courses are required in each language (including compulsory written and oral work in each year of the program). Spanish 38.210 must be taken, and a comprehensive examination (or a series of terminal essays) is to be completed by students during their final year. See also p. 181.

Students interested in pursuing an Honours program in which Spanish is combined with another subject are invited to discuss the matter with the Chairman of the Department of Spanish. The minimum requirements would be seven courses in Spanish.

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Graduate Courses

The M.A. program, begun in 1966, provides scope for study in depth of topics on Spanish and Spanish American language and literature. Courses in the 500 series currently being offered are found on pp. 308-309.

Regulations governing M.A. studies will be found on pp. 88-89. Students will note that a program in Spanish studies will admit, where appropriate, a credit in Romance Philology or Comparative Literature as well as certain Spanish courses at the 200-499 level.

All courses taken by graduate students will be chosen in consultation with the Department.

Students should note that, in addition to the Comprehensive Examinations in the M.A. year, they will have to satisfy the requirements of a (non-credit) Departmental Seminar on Bibliography and Research Methods, to be taken in either the Qualifying or the M.A. year.

Spanish 38.015, Introductory Spanish

An intensified course designed to give the student the fundamentals of written and spoken Spanish, together with a general introduction to Hispanic culture. Attendance at both classes and laboratory sessions is compulsory.
Texts: Da Silva, *Beginning Spanish* (Grammar and tape manual), 2nd edition.
Sábato, *El túnel* (summer reading for Spanish 38.100).
Day and Evening Divisions: Annually (lectures and laboratory four hours a week).
Members of the Department

Spanish 06.132, Intensive Introductory Spanish

A course designed to satisfy the first-year language requirement of students entering Carleton with little or no background in Spanish. The course will cover material taught in Spanish 38.015 (or 06.030) and 38.100 (or 06.130).
Students not making satisfactory progress will be transferred to the regular Introductory course (38.015 or 06.030).
Prerequisite: Permission of the Department.
Texts: to be announced.
Day Division: Annually, St. Patrick's College campus (lectures and laboratory six hours a week).
P. Roster

Spanish 38.100, Intermediate Spanish

A course intended to consolidate and supplement knowledge of the language and culture acquired in Spanish 38.015. Students who take Spanish 38.100 are expected to have fulfilled summer reading requirements.
Prerequisite: Spanish 38.015 or 06.030 or equivalent.
Texts: Da Silva and Lovett, *A Concept Approach to Spanish* (Grammar and tape manual).
Leal and Silverman, *Siglo Veinte;* and others.
Day and Evening Divisions: Annually (lectures and laboratory four hours a week).
Members of the Department

Spanish 38.101, Intensive Intermediate Spanish

A course for potential majors, to include more advanced language and reading than Spanish 38.100.
Prerequisites: Spanish 38.015 (or 06.030) and permission of the Department.
Texts: Da Silva and Lovett, *A Concept Approach to Spanish* (Grammar and tape manual).
Leal and Silverman, *Siglo Veinte;* and others.
Day Division: 1968-69 (lectures and laboratory four hours a week).
F. de Toro-Garland

Spanish 38.201*, Spanish Conversation

Conversation and discussion of current problems, supplemented by occasional written work.
Prerequisite: Spanish 38.100 (or 38.101 or 06.132) or permission of the Department.
Texts: Carballo Picazo, *Español conversacional;* Antología del Teatro, 1962-63; and others.
Day and Evening Divisions: Annually (two hours a week throughout the year).
Members of the Department

Spanish 38.202*, Spanish Composition

A course designed to consolidate the linguistic knowledge attained in Spanish 38.100, and to inculcate the elements of a good Spanish style.
Prerequisite: Spanish 38.100 (or 38.101 or 06.132) or permission of the Department.
Texts: Levy, *Present-Day Spanish,* and others.
Day and Evening Divisions: Annually (two hours a week throughout the year).
Members of the Department

Spanish 38.210, Hispanic Civilization

An introduction to the culture and civilization of Spain and Spanish America, including readings from their literatures. Required course for majors and honours.
Prerequisite: Spanish 38.100 (or 38.101 or 06.132) or permission of the Department.
Principal Texts: Ugarte, *Panorama de la civilización española;*
Arciniegas, *El continente de siete colores.*
Day and Evening Divisions: Annually (three hours a week).
J. Jurado and F. de Toro-Garland

Spanish 06.230, Survey of Spanish Literature and Culture

The evolution of Spanish literature against its historical background, through the study of representative literary works of all types from the Middle Ages to the present.
Prerequisite: Spanish 38.100 (or 06.130 or 06.132) or permission of the Department.
Texts: Del Río, *Antología general de la literatura española,* Vols. I and II.
Day Division: 1968-69 (three hours a week). To be offered on the Rideau River campus.
Lillian Jackson

Spanish 38.301*, Advanced Oral Spanish

An advanced sequel to Spanish 38.201*.
Prerequisite: Spanish 38.201* or permission of the Department.
Day and Evening Divisions: Annually (two hours a week throughout the year).
Members of the Department

Spanish 38.302*, Advanced Spanish Composition

An advanced sequel to Spanish 38.202*.
Prerequisite: Spanish 38.202* or permission of the Department.
Day and Evening Divisions: Annually (two hours a week throughout the year).
Members of the Department

Spanish 38.320, The Golden Age

Spanish literature of the 16th and 17th centuries. Study of the principal works from *La Celestina* to Calderón.
Prerequisite: Spanish 38.210 or permission of the Department.
Day Division: 1968-69 (three hours a week). To be offered on the St. Patrick's College campus.
J. M. López-Saiz

Spanish 38.330, Modern Spanish Literature

Spanish literature of the 19th and 20th centuries.
Prerequisite: Spanish 38.210 or permission of the Department.
Evening Division: 1968-69 (three hours a week).
F. Atienza

Spanish 38.350, Spanish American Literature

The evolution of Spanish American literature through the study of representative literary works of all types from most Spanish American countries.
Prerequisite: Spanish 38.210 or permission of the Department.
Day Division: 1968-69 (three hours a week).
R. Larson

Spanish 38.415, Introduction to Medieval Literature

Phonology, morphology and syntax of Old Spanish. Textual criticism of major works up to the end of the 15th century.
Prerequisite: Spanish 38.302* or 38.320 and knowledge of Latin, or permission of the Department.
Not offered, 1968-69.

Spanish 38.420, Cervantes

A study of Cervantes and his age with particular reference to *Don Quijote*.
Prerequisite: Spanish 38.320 or permission of the Department.
Day Division: 1968-69 (three hours a week).
C. A. Marsden

Spanish 38.430, Modern Spanish Novel

Representative works of the 19th and 20th centuries.
Prerequisite: Spanish 38.330 or permission of the Department.
Not offered, 1968-69.

Spanish 38.450, 20th Century Spanish American Poetry

A study of the principal tendencies in 20th century Spanish American poetry.
Prerequisite: Spanish 38.350 or permission of the Department.
Not offered, 1968-69.

Spanish 38.460, 20th Century Spanish American Novel

The characteristic works of the most noteworthy novelists of the 20th century.
Prerequisite: Spanish 38.350 or permission of the Department.
Evening Division: 1968-69 (three hours a week).
R. L. Jackson

Spanish 38.490, Seminar on a Special Topic

Designed for Honours students normally in their final year, or for Graduate students.
Research topics have in the past included: *García Lorca, Unamuno, Rubén Darío, Martí*, and *La Celestina*.
Topic for 1968-69: *Poets of the Generation of 1927* (hours to be arranged).
Prerequisite: Permission of the Department.
A. López-Fernández

Spanish 38.505, History of the Spanish Language

Annually (hours to be arranged).
J. Jurado

Spanish 38.515, Aspects of Medieval Literature

Topic for 1968-69: *El Libro de Buen Amor* (hours to be arranged).
F. de Toro-Garland

Spanish 38.520, Special topic on Golden Age Literature

Not offered, 1968-69.

Spanish 38.525, Studies in 18th century Neo-Classicism

Not offered, 1968-69.

Spanish 38.530, Problems of Modern Spanish Literature

Topic for 1968-69: *The Spanish Approach to Existentialism*: *Unamuno.* (hours to be arranged).
F. Atienza

Spanish 38.550, Aspects of Spanish American Literature 1

Not offered, 1968-69.

Spanish 38.560, Aspects of Spanish American Literature II

Topic for 1968-69: *Twentieth Century Spanish American Poetry and its relationship to the Generation of 1927.* (hours to be arranged).
[*Note*: students enrolling in this course are advised to take also Spanish 38.490].
L. Lorenzo-Rivero

Spanish 38.570, Special problems in Spanish American Literature

Not offered, 1968-69.

Spanish 38.585, Seminar

Spanish 38.599, M.A. Thesis

Student Activities and Services

Student Activities

Student Participation in Academic Affairs

Students at Carleton are formally involved in the government of the University at the level of departments, faculty boards and Senate. Students in the second and subsequent years are eligible for nomination and election to these various bodies.

Student Government

All registered students, day and evening, are members of the Students' Association. The Association is responsible for a large portion of student life on campus. As a self-governing body, it has a great deal of responsibility and independence in the handling of its affairs. Its functions include providing a channel of communication with the University authorities and with students throughout Canada and the rest of the world.

The legislative body for the Association is the Students' Council. Representatives from each faculty are elected to it in winter, to serve from March 15 to March 14 of the following academic year. Representatives of graduate students and residences are chosen in the fall, to serve from October 15 to October 14 of the following academic year.

The other members of the Students' Council are the executive arm of the Association, and these persons are elected in the winter to serve from March 15 until March 14 of the following academic year. Executive positions are: President, Vice-President (who doubles as Education Commissioner), Finance Commissioner, Activities Commissioner, Community Programme Commissioner and Communications Commissioner.

The Association sponsors a wide variety of activities. Debates and symposiums concerning the financing and quality of education, publications, clubs, musical and dramatic societies, social functions, and other recreational and cultural undertakings constitute the co-curricular student program. All of the co-curricular activities handled by the Association are aimed at involving students in more than purely academic pursuits, as well as maintaining a keen interest in the students' academic courses.

Student Conduct

The Students' Association has been entrusted with a great deal of responsibility for the behaviour and discipline of all students at Carleton. Student conduct is governed by an Honour System and students are expected to know and adhere to the rules and regulations of the Association. Those who commit infractions are expected to report themselves; and, failing this, they may be reported by those witnessing the infraction. Administration of the Honour System is the responsibility of two bodies— an Honour Board (whose duties include education, investigation and prosecution) and a Judicial Committee.

Athletics

The Athletics program at Carleton, which plays an important role in maintaining and enhancing the University spirit, is under the control of the Athletics Board Athletics activities fall into the two basic categories of intramural and extramural.

Extramurally, Carleton is a member of the Ontario-Quebec Athletic Association. Carleton varsity teams, called the Ravens, participate in basketball, football, hockey, soccer, skiing, badminton, tennis, golf, track and field, fencing and curling.

The intramural program includes flag-football, cross country, basketball, broomball, volleyball, badminton, table-tennis and foul shooting. Some of these sports are co-educational although most are played separately by men and women.

If you are interested in participating in Athletics at Carleton, talk to the Director of Athletics, Keith Harris, or the Assistant Directors, Kim McCuaig or Sandra Knox.

University Union

The gymnasium building includes the following facilities: lounging and T.V. room, reading areas, table tennis, music room, tuck shop, billiards, squash courts, weight lifting facilities, combatives room and a multi-purpose gymnasium with a tartan floor.

A large, centrally located Union building is in the process of being planned by the University in co-operation with the Students' Association.

Student Services

Housing
1. Residences: The University now has four residence halls: Lanark and Renfrew houses accommodate 322 women students, Grenville and Russell houses provide for 360 men. The rooms are furnished, including blankets and linens. Board and room for the academic year is $865 for single, and $815 for double rooms. For information and application forms, write the Provost of Residences, 1231 Colonel By Drive, Ottawa 1.
2. Off Campus: The University housing registry will provide students who are interested in living off-campus with an off-campus Housing Booklet which contains a description of all accommodations that are available and suitable for University Students. Rates for such accommodation range from $40 to $120 per month depending upon arrangements made for meals. Experience has shown, however, that living expenses for students are generally equivalent whether one lives off-campus or in residence. For information or copies of the off-campus housing booklet, contact the Student Personnel Office.

Approximate Cost of One Year (8 months) at the University

1. Tuition: Arts, Commerce, Journalism, Science,	$537.50
Engineering	$597.50
2. Books, Instruments and Supplies	$65-$150.00
(The maximum named is typical for 2nd year Engineering Students)	
3. Board and Room in Residence	$815-$865.00
4. Board and Room off-campus — 2 meals in home, lunch in University Cafeteria	$800-$850.00
5. Clothes, Laundry, Entertainment, Transportation	$300-$450.00
Total	$1,670-$2,055.00

Food
The University Commons contains a cafeteria for those desiring full meals (Breakfast — 75c, Lunch — $1.00, Dinner — $1.50) and a snack bar for short orders. In addition, many of the buildings are serviced by vending machines for light refreshment.

Counselling and Health
The University Health Service is provided to protect and improve the physical and mental health of the students and of the university community. Its responsibilities are to ascertain the fitness of students to perform academic work and to participate in such activities as athletics, to consult and advise on matters of health, and to provide treatment within the limitations determined by facilities and availability of staff. When the necessary service cannot be provided by the program, the staff will endeavour through referral, to make available what is required. The nature of the service demands that the confidentiality of records and information be respected and maintained.

The University Health Clinic has regular hours and is staffed by a physician and nurse, counsellors and a consulting psychiatrist.

Academic Advice
Students wishing assistance in planning their educational programs or in choosing a career should see: a) their Faculty Adviser; b) administrative officers, particularly the Deans, the Department Chairman, the Dean of Students or a member of the Counselling Service. Mr. Andre Elbaz serves as Adviser for Overseas Students, who are invited to consult with him. Students who have been elected to department, faculty boards and Senate are also available for counselling on academic matters.

Placement

The Student Personnel Office helps a great number of Carleton students find either part-time, summer or permanent employment. This service is available to Alumni of Carleton as well.

Military Training

1. Qualified young men to serve as officers in Canada's Armed Forces are a continuing need. The professional ability required of present-day officers demands the best in education and training. The Department of National Defence therefore sponsors a program of university education and leadership training for selected numbers of young men who have the potential to become officers in the Canadian Armed Forces. The program is the Regular Officer Training Plan (ROTP) carried on either in the Universities or in the Canadian Services Colleges.

2. Candidates with senior matriculation, junior matriculation, or who are university undergraduates taking suitable courses, are eligible to apply for enrolment as officer cadets in the Forces. The admission standards are high, but for those who qualify, the way is open to a challenging and rewarding career. Students who are selected for the ROTP while attending university will be enrolled in the Forces while continuing their university studies.

3. Training in the ROTP is divided into two parts. Cadets attend a Canadian Services College or a University throughout the academic year and then go to a unit or training establishment for training each summer.

4. *Academic Training.* In general terms, the courses which are needed in business and industry are also required in the Armed Forces. The following are broad patterns:

> Engineering — Civil, Mechanical, Electrical, Engineering Physics, Chemical.
> Arts — General, Honors.
> Science — General, Honors.
> Other specialist courses which may be required by the Armed Forces.

5. *Conditions of Service.* Successful applicants will be enrolled as Officer Cadets in the Canadian Armed Forces. Cadets are obliged to maintain good standing academically and in military training. A cadet who fails a year, or who lacks adequate standing in a subject from a previous year, loses his benefits. On the recommendation of his faculty, he may be permitted to repeat one year at his own expense and, if successful, be re-instated.

6. An Officer Cadet who graduates, and has successfully completed his Service training program during the summer months, is promoted to the commissioned rank of Lieutenant.

7. *Financial Assistance.* Tuition and other essential fees are paid by the Department of National Defence. Officer Cadets attending university receive an allowance of $125.00 each year to purchase books and instruments.

> Scale of pay and allowances for ROTP Cadets is:
> Pay (on enrolment) .... $187.00 per month
> Pay (after 3 years service) .... $192.00 per month

Free medical and dental care is provided. Annual Leave (30 days plus travelling time) with pay and allowances may be granted each year, usually after the summer training period.

8. *Admission Requirements*. An applicant must have the following qualifications:
   a. be a Canadian citizen;
   b. be single and remain so until commissioned;
   c. be physically fit for enrolment in the Forces; and
   d. have reached his 16th Birthday, but not his 21st birthday on the first of January of the year of entrance if applying with senior matriculation; or his 20th birthday if applying with junior matriculation. Consent of a parent or guardian is required if he is under 18 years of age.

9. *How to Apply*. Students interested in this program are requested to contact the following office:

> Commanding Officer,
> Canadian Forces Recruiting Centre,
> 239 Queen Street,
> Ottawa 4, Ontario.
> Telephone 233-4039

Index to Medals, Scholarships, Prizes, Bursaries and Loans

MEDALS

SCHOLARSHIPS

PRIZES

BURSARIES

LOAN FUNDS

Academic Awards
and Financial Assistance

Medals are the major academic awards granted by the University to its superior graduating scholars. They have no monetary value.

Scholarships are awarded to students on entry to the University and to those in course on the basis of superior academic performance. Those with the highest scholastic standing are granted the scholarships having the highest monetary value. Applications are not required for Entrance or In-Course Scholarships. An exception is the Mohr Scholarships for entering and undergraduate students. (see page 325).

All students registered at St. Patrick's College campus are eligible for many of the awards, both Entrance and continuing in the Faculty of Arts, that come under the jurisdiction of the Student Awards Office of the University.

Fellowships are awarded to students entering or in graduate studies at the University. Limited teaching duties are usually required of Fellows.

Prizes are awarded for excellence in particular areas of study. They may be cash awards or book prizes. No application is required.

Bursaries are awarded to students who can show genuine evidence of financial need and who have above average standing. Applications for bursaries should be made to the Awards Office not later than August 1. Students who are residents of the Province of Ontario or the Province of Quebec are required to apply for Provincial Bursaries (Student Awards) (see page 337).

Loans are awarded to students with satisfactory academic records who could not continue their studies without financial assistance. Applications for loans should be made to the Awards Office.

See index of awards on pages 318-321.

Financial Aid for Students

1. *Source of Funds*. Funds for scholarships, prizes, bursaries, and loans are provided by the University and by gifts from individuals and associations. The University welcomes the offer of scholarships, prizes, medals, and bursaries. The Awards Office will be glad to send, on request, information as to the functions of scholarships and bursaries, and also a statement of particular needs at present in the financial aid program of the University. Scholarships, prizes, medals, bursaries, and loan funds may be accepted from donors at the discretion of Senate on appropriate recommendation of the President.

2. *Administration of Awards*. Awards of medals, scholarships, and prizes will be made by Senate to qualified candidates of merit; but the Senate may withhold any such award if no candidates of merit present themselves. The award of scholarships, prizes, and medals shall be final when formally announced by the University.

3. The standing of students being considered for any such awards shall be determined on the basis of courses taken for credit and shall not take account of extra courses being taken for no credit.

4. (a) No limitation shall be placed upon the number of prizes and medals which any one student may win in any one year. (b) A student may be declared the winner of as many scholarships as he may win as a qualified candidate of merit but, in the case of awards carrying a major financial amount, such student will normally receive the proceeds only of the largest among these major amounts. (c) Winners of scholarships and prizes may resign the monetary value but retain the honour of such awards, and their names will be published as winners. In cases arising under 4(b) or 4(c), the monetary amounts so relinquished may be awarded by reversion if merited.

5. Scholars who hold continuing scholarships at Carleton University must maintain a level of academic performance each year satisfactory to the Committee on Admission and Studies, or relinquish their scholarships.

6. Students receiving scholarships and bursaries exceeding in total $200 which are under the jurisdiction of the University will ordinarily be paid in two instalments, one in October and one in January. The University reserves the right to withhold the payment of the second instalment if the attendance or conduct of the student is not satisfactory. Awards of less than $200 will ordinarily be paid in one instalment, in October.

7. The University does not guarantee the award of any scholarship, prize, medal, or bursary other than those created from funds of the University. Those awards based upon gifts of individuals or associations other than the University will be forwarded only after the funds required have actually been received from the donors.

Awards for Academic Excellence

Medals

The Governor-General's Medal
Awarded annually, to the student standing at the head of the graduating class. Donor: His Excellency the Governor-General of Canada. Established 1952.

University Medals
Awarded annually, when merited, to the graduating students standing highest in Arts, Science, Commerce, Journalism, and Engineering. Established 1949.

Senate Medals
Awarded, when merited, to graduating students of outstanding academic achievement. Established 1952.

Medal in Engineering (Ontario Association of Professional Engineers)
Awarded annually, when merited, to the graduating student standing highest in Engineering. Established 1961.

Scholarships

1. Entrance Scholarships Tenable at Carleton University

Henry Marshall Tory Scholarships
Eight Entrance Scholarships of $500 each have been established by the University for open competition among students entering Carleton University at either senior or junior matriculation level. Each scholarship will be tenable for one year. Established 1961, and named to commemorate the first president of Carleton University, Dr. Henry Marshall Tory.

Francis C. C. Lynch Entrance Scholarships
Fifteen Entrance Scholarships of $400 each have been established for open competition among students entering the first year of Arts, Science, Commerce, Journalism or Engineering. Preference will be given where possible to an applicant from each of the Ottawa secondary schools. Each scholarship will be tenable for one year. Donor: The late Francis C. C. Lynch. Established 1967.

Mercy Neal Southam Entrance Scholarships

Four $500 scholarships will be awarded annually, if merited, to students entering the First year of Arts, Journalism, Commerce, Science, or Engineering at Carleton University.

The conditions of award and administration of the Mercy Neal Southam Entrance scholarships will be the same as those governing the University Entrance scholarships (described immediately above) except that each scholarship will be payable in two successive annual instalments of $250, subject to scholarly performance.

Established in 1949 under the terms of bequest of the late Wilson Mills Southam, the scholarships are in memory of his grandmother, Mercy Neal Southam.

Ontario Scholarship Program

The Province of Ontario awards an Ontario Scholarship to all students who achieve an average of 80% or better in papers worth seven high school credits, as required for the Ontario Secondary Honour Graduation Diploma, and written in June of the year of completion of Grade 13. These students will be designated "Ontario Scholars" and will receive an award of $150 or less depending on the amount of other awards.

University Entrance Scholarships

Eight scholarships valued at $400 each for one year have been provided by the University for general competition among the students entering Carleton University at the senior or junior matriculation level.

General Entrance Scholarships

Twenty scholarships valued at $300 each for one year have been provided by the University for general competition among students entering Carleton University at the senior and junior matriculation level. Established 1963.

Friends of Carleton Scholarships

Fifteen scholarships valued at $300 each have been provided for general competition among students entering Carleton University at the senior and junior matriculation level. Each scholarship will be tenable for one year.

Donor: The Friends of Carleton University. Established 1967.

Ottawa Citizen Scholarship

A scholarship valued at $1200 will be awarded annually, if merited, to a student entering Carleton University from a high school in any one of the following counties in the Ottawa district: nine in Ontario—Carleton, Dundas, Glengarry, Grenville, Lanark, Prescott, Renfrew, Russell and Stormont—and four in Quebec—Gatineau, Hull, Papineau and Pontiac.

Candidates with junior or senior matriculation may apply for admission to Qualifying University or First year of Arts, Commerce, Journalism, or Science.

Candidates with senior matriculation may apply for admission to Engineering.

A student admitted with junior matriculation standing will receive $300 per year for a period of four years; a student admitted with senior matriculation standing will receive $400 per year for a period of three years; always provided that, in both cases, the student is registered as a regular full-time student of Carleton University and maintains a satisfactory academic standing.

A candidate for this scholarship must present evidence of high scholastic attainment, together with a record of outstanding participation in the extra-curricular activities of his school.

Donor: The Ottawa Citizen. Established 1955.

Duchess of Connaught Scholarship

The yield from the endowment of this historic scholarship, amounting to approximately $350 annually, has been made available to Carleton University by the Laurentian Chapter, I.O.D.E. The scholarship is to be awarded to an able student entering Carleton University, and may be held until graduation, if merited; at which time a new award will be made.

Donor: Laurentian Chapter, I.O.D.E. Established at Carleton University, 1960.

Dobbie Regional Entrance Scholarships

Eight Entrance Scholarships valued at $400 each will be available for 1968-69 for students entering Carleton University with junior or senior matriculation standing on the following distribution:

(a) Four scholarships available for Ontario (except the City of Ottawa) and the Western Provinces and Territories.

(b) Four scholarships available for Quebec Province and the Maritime Provinces. Each scholarship will be tenable for one year.

Donor: The late Jemema Grace Dobbie. Endowed 1967.

International Nickel Company Scholarship

One entrance scholarship has been established by The International Nickel Company of Canada, Limited, restricted to study in the fields of engineering, geology, geophysics, mathematics, chemistry, and physics. The scholarship covers tuition fees, a grant of $300.00 to the student, as well as a cost-of-education supplement of $500.00 to the University. The maximum award for a scholarship is $1,200.00. Any graduate of a high school or the equivalent, or any student in his final high school year, who has good scholastic standing and personal reputation, is eligible. It is awarded by the University Scholarships Committee on the basis of the applicant's record, character, and financial need. The scholarship is renewable annually to the student for a maximum of three additional academic years or, in certain cases, until graduation, whichever is the shorter period. Further details from the Awards Office.

Donor: The International Nickel Company of Canada, Limited. Established 1956.

D. Roy Campbell Entrance Scholarship

Value $500. Awarded annually for a period of ten years, under the terms of the will of the late D. Roy Campbell, for competition among students entering Carleton University with high standing in the senior matriculation examinations or the equivalent.

Donor: The late D. Roy Campbell. Established 1962.

Dr. Frederick William Charles Mohr Scholarships

Twenty-six scholarships of a maximum value of $500 each have been made available for annual competition among students entering Carleton University or proceeding from one year of course to another at the University, and who come from communities within the following Ontario and Quebec counties:

Ontario: Renfrew, Russell, Prescott, Glengarry, Stormont, Dundas, Grenville, Carleton, Lanark, Nipissing, Leeds.

Quebec: Pontiac, Gatineau, Hull, Papineau, Argenteuil, Temiskaming.

These awards are provided through the bequest of the late Dr. F. W. C. Mohr.

The scholarships will be awarded by the University on the basis of high academic performance and of financial need. It is necessary to make specific application for these scholarships, and forms for this purpose may be obtained at all times from the Awards Office.

Donor: The Frederick W. C. Mohr Estate. Endowed 1963.

Association of Professional Engineers' Entrance Scholarship
Value $500. Awarded annually to a Grade 13 student of high proficiency who is entering the engineering course.
Donor: The Ontario Professional Engineers' Foundation for Education. Established 1961.

James H. Rattray Memorial Scholarships
Two scholarships valued at $200 each. Awarded annually to a student entering the first year Engineering at Carleton University.
Donor: The late James H. Rattray, M.C. Endowed 1961.

Naomi Cook Scholarship Fund
Value $250 approximately. Awarded annually to students with high academic standing entering Carleton University.
Donor: The late Naomi Cook. Endowed 1967.

W. H. Cramm Scholarship
Value $200 approximately. Awarded annually to a male student of high proficiency entering Carleton University from Nepean High School, Ottawa.
Donor: The late Jennie Shibley Cramm. Endowed 1967.

Jennie Shibley Cramm Scholarship
Value $200 approximately. Awarded annually to a female student of high proficiency entering Carleton University from Nepean High School, Ottawa.
Donor: The late Jennie Shibley Cramm. Endowed 1967.

Donald William Buchanan Scholarship
Value $250 approximately. Awarded annually for general competition among students entering Carleton University at the senior or junior matriculation level.
Donor: The late Donald William Buchanan. Endowed 1967.

Page and Steele School of Architecture Scholarship
Value $300. Awarded annually to an outstanding student enrolled in the School of Architecture at Carleton University.
Donor: Page and Steele Architects. Established 1967.

Watson J. Balharrie Scholarship
Value $200. Awarded annually to a student who has studied for two successive years in the School of Architecture of Carleton University with distinction. (Available until 1970 to *all* architectural students who enroll).
Donor: Anonymous. Established 1967, on the death of Professor Watson J. Balharrie, a distinguished Ottawa architect, who taught for twenty years at McGill University.

James E. Whenham Scholarship
Value $200. Awarded annually to a student of superior standing enrolled in the School of Architecture, Carleton University.
Donor: James E. Whenham. Established 1968.

Army, Navy & Air Force Veterans in Canada (Ottawa Unit) Centennial Scholarship
Value $500. Awarded annually for general competition among students entering Carleton University at the senior or junior matriculation level from the Secondary Schools of Metropolitan Ottawa. Preference will be given, where possible, to the children of veterans.
Donor: The Army, Navy and Air Force Veterans in Canada, Ottawa Unit 352. Established 1968.

II. Scholarships for Undergraduate Competition

J. P. Bickell Foundation Scholarships
The Trustees of the J. P. Bickell Foundation have established in the Department of Geology, Faculty of Science, scholarships for students entering the Geological profession, of a possible value of $1,500 each. The Scholarships may be awarded on entrance into the Honours Geological sequence at the First, Second or Third year levels at Carleton University. The scholarships are payable over two or three years depending on the entrance level. Three Scholarships will be available for 1968-69.

Application must be made to the Chairman of the Department of Geology by May 15. In order to be eligible, the applicant must undertake to register in the Honours Geology sequence with a minor in Biology, Chemistry, Mathematics, or Physics; or a combined Honours sequence of Geology and one of the above-mentioned subjects.

Full particulars and application forms may be obtained from the Awards Office.

Alcan Scholarship
A scholarship has been established by the Aluminum Company of Canada, Limited, restricted to students proceeding to a degree in Honours Chemistry, Mathematics or Physics, in Engineering Physics, or Mechanical Engineering.

The award will normally be in the amount of $500 to the student, with an additional grant of $200 to the university; it is made by the University Scholarships Committee on the basis of the applicant's record, character and financial need. The holder of the scholarship may reapply for it in the following year and will be considered on an equal basis with other students.

Donor: The Aluminum Company of Canada, Limited. Established 1964.

C.U.S. (N.F.C.U.S.) Interregional Study Exchange Plan
Since 1952, Carleton University has participated in the Interregional Study Exchange Plan sponsored by the Canadian Union of Students.

Each year, five students from universities other than English-language institutions of Ontario and Quebec may be granted free tuition at Carleton for the studies of their penultimate year. At least two Carleton students may be chosen from among those who apply for permission to study, tuition free, at French-language universities in Quebec, or universities of the west coast, the prairies or the Maritimes.

Carleton students wishing to apply for participation in the plan should consult the Registrar before January 15. Selection will be made by a committee composed of the Dean of the Faculty of Arts, the Registrar, the President of the Students' Council, and the External Affairs Chairman of the Students' Council. All applicants will be subject to the approval of the host university.

Maxwell MacOdrum Scholarships
Five scholarships totalling $2,500 have been provided by the University for annual competition for undergraduates entering the fourth year of course. Each scholarship will be awarded on a basis of outstanding performance and will be tenable for one year.

The scholarships are named in memory of Dr. Maxwell MacOdrum, second president of Carleton University. Established 1961.

Carleton Alumni Association Scholarships
Scholarships totalling $1,000 have been provided for undergraduates passing from one year of course to another at Carleton University with high standing. Certain of the scholarships are reserved for students in honours.

Donor: The Alumni Association of Carleton University.

The James A. Gibson Scholarships
Scholarships totalling $1,000 have been provided for superior students passing into the final year of the undergraduate course at Carleton University. The scholarships are named in honour of Dr. James A. Gibson, former Dean of the Faculty of Arts and Deputy to the President of Carleton University.
Donor: The Alumni Association of Carleton University.

Irene Gertrude Stitt Scholarship Fund
Four scholarships totalling $1,600. Awarded annually to students of high proficiency proceeding from one year of course to another at Carleton University. The fund has been made possible by a bequest of the late Edith May Stitt, in memory of her sister, Irene G. Stitt. Endowed 1966.

Arthur A. Crawley and Company Scholarship
Value $500. Awarded annually, if merited, to the student obtaining the highest average marks in second year Commerce, or in second year Arts (Economics), who proposes to pursue upon graduation the course given by the Institute of Chartered Accountants of Ontario. The scholarship is of value of $500, payable $250 at time of registration for the third year course at Carleton University, and $250 on January 2 following, provided the student is in good standing at Carleton University.
Donor: Arthur A. Crawley and Company, Ottawa. Established 1964.

Association of Professional Engineers' Scholarships
Value $250 each. Awarded annually to engineering students of high proficiency proceeding from one year of course to another in Carleton University.
Donor: The Ontario Professional Engineers' Foundation for Education. Established 1961.

Touche, Ross, Bailey and Smart Scholarship
Value $250. Awarded to a student who is entering the final year of the degree course in Commerce, and who intends upon graduation to study for the qualification of Chartered Acountant. The award will be made to the student whose character, ability, academic records, and other qualities are, in the opinion of the Committee on Commerce Studies, those needed by a Chartered Accountant. Applications should be submitted to the Chairman of the Commerce Studies before March 1.
Donor: Touche, Ross, Bailey and Smart. Established 1962.

Ottawa Ladies' College Scholarships
Ten scholarships totalling $4,000 have been provided by the University for annual competition among undergraduates for the various disciplines. Each scholarship will be awarded on the basis of outstanding performance and will be tenable for one year. Endowed 1967.

Francis C. C. Lynch In-Course Scholarships
Fifteen scholarships totalling $6,000 have been provided for undergraduates passing from one year of course to another at Carleton University with high standing.
Donor: The late Francis C. C. Lynch. Endowed 1967.

Jacob Freedman Scholarships
Two scholarships totalling $800. Awarded annually to outstanding students who are proceeding from one year of course to another at Carleton University.
Donor: The late Jacob Freedman. Endowed 1967.

Hume Wrong Scholarship

Value approximately $225, being the yield of a fund of $5,000, established by Mrs. Hume Wrong in memory of her late husband. Awarded annually to the leading student in third year History or Political Science, proceeding to his or her final honours year.

Donor: Mrs. Hume Wrong. Established 1962.

Gavin Scott Macfarlane Memorial Scholarship

Value $200. Awarded annually to an outstanding student, preferably in Honours, who is proceeding from one year of course to another in Carleton University.

First donated 1957, by Mrs. G. S. Macfarlane in memory of her husband, Lieutenant-Colonel Gavin Scott Macfarlane.

Lord Dundonald Chapter (I.O.D.E.) Scholarship

Value $100. Awarded annually to a student of superior standing and general proficiency, entering the final year of a degree course at Carleton University.

Donor: Lord Dundonald Chapter, I.O.D.E. Established 1956.

Ottawa Women's Canadian Club War Memorial Scholarship

Value approximately $100. Awarded annually to a student progressing from Qualifying University year to First year in Carleton University. Preference is given to veterans or their children. Endowed 1946.

Clendinnen Scholarship in Biology

Value $100. Awarded annually to an outstanding student proceeding from the third to the fourth year of the honours course in Biology at Carleton University.

Established 1951, in memory of Mr. and Mrs. T. E. Clendinnen, by their daughter.

University Women's Club of Ottawa Scholarships

Two scholarships valued at $250 each. Awarded annually to a woman student at Carleton University enrolled in a degree program as a part-time student and who has completed at least two full courses with second class standing or better. These awards are to be administered by the Scholarship Committee of the University Women's Club of Ottawa in co-operation with Carleton University.

Donor: University Women's Club of Ottawa. First established in 1952 in honour of Dr. Alice E. Wilson.

Charles Anthony Blundell Betts Memorial Scholarship in Physics

Value approximately $450. Awarded annually, if merited, to a student of high proficiency in Physics, entering or continuing in Physics Honours or in the Major Course, in the second or subsequent years of the degree course.

Donors: Mr. and Mrs. Oliver Betts, Birmingham, England, in memory of their son, Charles Anthony Blundell Betts. Established 1964.

C. V. Hotson Memorial Scholarship

Value $100. Awarded annually to an undergraduate student who maintains high academic standing and is active in student affairs. Donated by Carleton Alumni and other friends in memory of Mr. Hotson, a 1950 Carleton Journalism graduate and former member of the Students' Council who returned to Carleton in 1953 to become Administrative Assistant to the President and Executive Secretary of the Alumni Association, positions he held until his death in October, 1960.

Regent Vending Machines Limited, Scholarships
Two scholarships valued at $100 each. One scholarship is awarded annually to an outstanding student in Engineering proceeding from the First to Second year in the Engineering curriculum; and the second scholarship to such a student proceeding from the second to the third year of the curriculum.
Donor: Regent Vending Machines, Limited. Established 1954.

Regent Vending Machines Limited Centennial Scholarship
Value $250. Awarded annually to an outstanding student in Engineering proceeding from the Third to the Fourth year of the curriculum.
Donor: Regent Vending Machines, Limited. Established 1967.

Riddell, Stead, Graham and Hutchison Award
Value $500. This award is given to a student who is completing his pre-graduation year and is proceeding on to his graduating year. This award is to be applied to the payment of student's tuition fees for his final undergraduate year at Carleton. The award will be made to the student whose personality, ability, academic record and other characteristics are, in the opinion of the Committee on Commerce Studies, those needed by a Chartered Accountant.
Donor: Riddell, Stead, Graham and Hutchison. Established 1960.

Leonard Foundation Scholarships
The Leonard Foundation Scholarships are awarded each year to select students in Canadian universities and colleges, including Carleton University. Awards are based on certain areas of preference.
Applications must be submitted by March 1 to the Awards Office.

National Press Club of Canada Scholarship in Journalism
A sum equal to tuition fees to be awarded annually to a student enrolled in the final year in Journalism at Carleton University. Applications must be in the Awards Office, Carleton University, by August 15 of the year in which the scholarship is awarded.
Donor: The National Press Club of Canada. Established 1965.

Dr. Harry Katznelson Memorial Scholarship
Value approximately $100. Awarded annually to an outstanding student proceeding into an advanced year in the Honours Biology program.
Application must be made to the Chairman of the Department of Biology by May 15.
Donor: The Friends of the late Dr. Harry Katznelson, B.S.A., M.Sc., Ph.D., F.R.S.C., Director of the Microbiology Research Institute, Federal Department of Agriculture. Established 1965.

Women's Residence Association Scholarship
Value $150 to be applied to residence fees. Awarded annually to a female undergraduate returning to Residence and having attended Carleton University for a full winter session. Nominations must be received by the Provost of Residence by May 1.
Donor: The Women's Residence Association. Established 1966.

L. N. Wadlin Scholarship in Mathematics
Value approximately $225. Awarded annually to a student proceeding from one year to another at Carleton University who has shown excellence in the study of mathematics.
Donor: The late Lorenzo N. Wadlin. Endowed 1965.

Carleton University Faculty Scholarship Fund

Provided annually by the Faculty to assist students of good academic standing who have completed one academic year in the university. Established 1958 as Bursary Fund. Established 1967 as a Scholarship Fund.

J. Lansing Rudd Scholarship

Value $300 approximately. Awarded annually to a superior student progressing from Qualifying year to First year in Carleton University.
Donor: The late J. Lansing Rudd. Endowed 1967.

Lithwick, Lambert, Sim and Johnston Scholarship

Value $300. Awarded annually to an outstanding student who has completed the Third year of course in the School of Architecture at Carleton University. (This Scholarship will be first awarded in the spring of 1971).
Donors: Lithwick, Lambert, Sim and Johnston, Architects. Established 1968.

Public Relations Society Centennial Scholarship

Value $200. Awarded annually to a student with high standing entering the final year of his or her degree program in the School of Journalism or the Faculty of Arts at Carleton University.
Donor: Canadian Public Relations Society, Ottawa. Established 1967.

III. Post-Graduate Awards Tenable at Carleton University

General

Carleton University offers annually a number of fellowships of value ranging from $1,600-2,800. The Fellowships carry with them teaching duties; they do not include remission of fees. Bursary and loan funds are also available for graduate students (see pp. 337 and 343).
Applications for the Fellowships must be received by March 1.

Commonwealth Scholarships

Under a plan drawn up at a conference held in Oxford in 1959, each participating country of the Commonwealth offers a number of scholarships to students of other Commonwealth countries. These scholarships are mainly for graduate study and are tenable in the country making the offer. Awards are normally for two years and cover travelling, tuition fees, other university fees, and a living allowance.
For details of the awards offered by the various countries consult the Awards Office of Carleton University or write to the Association of Universities and Colleges of Canada, 151 Slater Street, Ottawa. Persons doing so are advised to inquire not later than October 11 in 1968, if planning to apply for the year 1968-69.

Northern Electric Graduate Research Fellowship

Value $1500. Established by the Northern Electric Company to assist graduate students proceeding towards a Master's or Doctor's degree in Electrical Engineering, Engineering Physics, Physics, Physical Chemistry, Metallurgy or Applied Mathematics, and preferably whose thesis work can be expected to have implications for the Communications industry. The candidate must be a Canadian citizen or landed immigrant in Canada, and a graduate of a recognized university. The candidate must provide the Northern Electric Company with a copy of his thesis when it is completed.
Applications must be received by the Graduate Studies Office by April 1.

Reader's Digest Fellowships in Journalism
Two fellowships of $500 each are available to graduates in Arts who have good standing in their academic subjects. Experience in practical journalism in any medium should be reported and will be taken into account. All the material relevant to the application, including information on past experience in newspaper, magazine, radio, TV or other fields of journalism or writing, together with letters of reference from newspaper editors, must be in the hands of the Awards Office, Carleton University, by August 15 of the year in which the fellowship is awarded.
Donor: Reader's Digest Association (Canada) Limited. Established 1961.

MacLean-Hunter Award in Journalism
Value $1,000. Awarded annually to a student entering the one year program in Journalism for university graduates mainly on the basis of previous academic performance.
Donor: MacLean-Hunter Publishing Company Limited. Established 1967.

Other Post-Graduate Awards tenable at Carleton
The awards available in greatest numbers to Canadian students are those offered by the National Research Council, the Canada Council, and the Government of Ontario. Further information is available through the Graduate Studies Office and the Awards Office at Carleton University.
The principal awards for overseas students are the Commonwealth Scholarships and those offered by the Canadian Government. Students should apply through the appropriate Government Education Offices in their own countries.
A full listing is given in the book "Awards for Graduate Study and Research", published by the Association of Universities and Colleges of Canada, 151 Slater Street, Ottawa.

IV. Post-Graduate Scholarships Tenable Elsewhere

Students are invited to watch the University bulletin board for notices of scholarships, and to consult the Awards Office which has a number of publications outlining fellowships and scholarships available for study in the various universities in Canada and abroad.

Province of Ontario Graduate Fellowships
Fellowships, up to the value of $1,500 for one academic year (8 month) or an amount not to exceed $2,000 for an academic year and the period between academic years (12 months) are offered by the Province of Ontario. The minimum prerequisite is an Ontario Honours B.A. or its equivalent. A Fellow pledges to give serious thought to a career in university teaching and during tenure he will undertake a full-time program of graduate study. Fellowships are tenable only at Ontario universities and most awards will be made to candidates who are residents of Ontario. Application is to be made on the prescribed form which may be obtained from the Dean of Graduate Studies and the Awards Office. Deadline date is February 15.

Prizes

Clarkson, Gordon & Co. Prize
Value $100. Awarded annually to the student with the highest standing in the First year of the Commerce course.
Donor: Clarkson, Gordon & Co. Established 1962.

B'nai B'rith Awards
Two of $50 each. Awarded annually to students with superior academic records, progressing from one course-year to another in Carleton University.
Donor: B'nai B'rith, Ottawa Lodge No. 885. Established 1947.

Faculty Club Prize
Value $25. Awarded by the Faculty Club of Carleton University to a student chosen by the President. Established 1946.

National Council of Jewish Women Award in History
Value $100. Awarded on the recommendation of the Department of History to the student achieving the best standing in Canadian History.
Donor: National Council of Jewish Women, Ottawa Section. Established 1950.

National Council of Jewish Women Award in Psychology
Value $100. Awarded on the recommendation of the Department of Psychology to the student achieving the best standing in Psychology.
Donor: National Council of Jewish Women, Ottawa Section. Established 1963.

Lilian I. Found Prize for Poetry
Value $25. Offered annually for the best lyric of fifty lines or less submitted by an undergraduate of Carleton University by March 15. Details may be obtained from the Department of English.
Donor: Mrs. Lilian I. Found. Endowed 1950.

Chemical Institute of Canada Prize
Value $25. Awarded as a book prize to the best student proceeding to the final year of the course leading to the degree of Bachelor of Science with honours in Chemistry.
Donor: The Chemical Institute of Canada. Established 1950.

Roderick C. McDonald Prize in Engineering
Value $250. Awarded annually to a graduating Engineering student. Donated by Mrs. Ishbel A. McDonald in memory of her husband, Roderick C. McDonald, who, before his death in 1961, was a member of the faculty of the School of Engineering. Established 1962.

Engineering Institute of Canada Prizes
For proficiency in engineering studies and an interest in professional affairs, a prize of $200 and an engraved certificate are awarded to a deserving student completing third year Engineering, and a prize of $100 and a certificate are awarded to a deserving student completing second year Engineering.
Donor: The Engineering Institute of Canada. Established 1965.

D. F. McKechnie Prize in Accounting
The yield of a $200 fund is used each year to purchase a book prize to be awarded, when merited, to a student in Commerce for proficiency in the study of accounting.
Donor: D. F. McKechnie, C.A. Endowed 1951.

Society of Chemical Industry Award
A gold key with the crest of the Society of Chemical Industry in front and the name of the winner, course, year and university on back is granted to the student who has the highest standing in the final year of the honours course in Chemistry. Winner will also receive a year's subscription to the Journal, Chemistry and Industry.
Donor: Canadian Section, Society of Chemical Industry. Established 1961.

American Society for Metals Prize in Engineering
Value $25. Awarded annually to a student with high standing in the first year of the Engineering course.
Donor: Ottawa Valley Chapter, American Society for Metals. Established 1951.

Henry Birks and Sons (Ontario) Ltd. Award
Value $25. Awarded annually to a Carleton University student with a superior academic record who has contributed substantially to extracurricular activities.
Donor: Henry Birks and Sons (Ontario) Ltd. Established 1951.

Wilgar Memorial Prize in English
The yield of a $200 fund is used each year for a book prize to be awarded to a Carleton University undergraduate who has shown excellence in essay-writing. Established 1951, in memory of the late W. P. Wilgar, Assistant Professor of English at Carleton University, 1948-50. Endowed 1952.

Henry Marshall Tory Award
Presented annually to an outstanding graduating student who has shown a high degree of academic application, has indicated an interest in the University by broad participation in extracurricular activities of a constructive nature, has indicated qualities of leadership, and has attended Carleton University for at least three winter sessions.
Each candidate is nominated by at least five members of the Students' Association and selection is made by a committee composed of the President of the University, the Dean of Students, the Awards Officer, a member of the Faculty Board, and three students chosen by the Students' Council.
The winner's name is inscribed on the master trophy and he receives a miniature replica.
The award was established in 1950 by the Students' Council of Carleton University.

H. Carl Goldenberg Book Prize
Value $25. Awarded annually as a book prize for excellence in Journalism subjects taken in the Second year of the Bachelor of Journalism Course.
Donor: H. Carl Goldenberg, O.B.E., Q.C., of Montreal. Established 1953.

Kenneth R. Wilson Memorial Award for Journalism Graduates
Value about $300. Offered annually to a student graduating in Journalism who, in the opinion of a board of selection, shows exceptional promise as a future reporter and interpreter of Canadian affairs. Endowed 1953, in memory of Kenneth R. Wilson, Ottawa Editor of The Financial Post, by a group of his personal friends.

Catherine Daumery Memorial Prize for Botanical Collection
Value $35, together with a book prize. Awarded annually, if merited, on the recommendation of the Department of Biology, to a student who has submitted, by November 1, an outstanding collection of mounted and identified flowering plants.
Donor: Anonymous. Established 1953.

Elizabeth White Memorial Prize for Zoological Collection
Value $35, together with a book prize. Awarded annually, if merited, on the recommendation of the Department of Biology, to a student who has submitted, by November 1, an outstanding collection of insects or arachnids, properly preserved and identified.
Donor: Anonymous. Established 1953.

Ottawa South Branch (W.C.T.U.) Prize

Value $50. To be awarded in 1968, if merited, to a student of Carleton University definitely planning to continue his studies in Divinity after graduation. The Prize is to be awarded to a student of high academic standing in the final examinations of the university year.
Donor: The Ottawa South Branch of the Women's Christian Temperance Union. Established 1953. Revised 1964.

Alan Larocque Prize in Mathematics

Value $15. Awarded annually as a book prize to the highest ranking graduate in Honours Mathematics.
Donor: Alan Larocque, B.Sc., an honours graduate in Mathematics of Carleton University. Established 1956.

Dr. M. Ralph Berke Prize in Chemistry

The yield of a $500 fund is awarded each year, if merited, on the recommendation of the Department of Chemistry for a prize to be awarded to an outstanding student majoring in Chemistry proceeding from the Second to the Third year of the degree course.
Donor: Dr. M. Ralph Berke. Established 1956.

American Society H.R.A.E. Prizes

Value $100, to be awarded 1968-69 as follows: one first prize of $75 for the best Summer Essay; one second prize of $25 for the Summer Essay.
Donor: American Society of Heating, Refrigerating, and Air Conditioning Engineers, Ottawa Valley Chapter. Established 1958.

Ann Smith Freedman Memorial Prize

Value $50. Awarded to the student in Psychology who has gained the highest standing in the experimental paper in Psychology 49.200 during the academic year.
Donors: Mr. and Mrs. Jarvis Freedman. Established 1958.

Prize of the Canadian Institute of Mining and Metallurgy (Ottawa Branch)

Value $150. To be awarded to a worthy student completing his Second year at Carleton University and registered in one of the branches of the mineral industry; the student to have attained at least high second class honours; the selection to be made by the Dean of the Faculty of Engineering and the Chairman of the Department of Geology, jointly. If there is no suitable candidate registered in one of the mineral science courses, the Award is to be made to a qualified student in one of the other branches of engineering. Established 1956.

International Nickel Co. of Canada Ltd. Award in Journalism

For the graduating student in Journalism with the best record in the Journalism subjects, a plaque and the prize of a portable typewriter is provided by the International Nickel Company of Canada, Limited. Established 1960.

Wild of Canada Ltd. Prize in Engineering

A prize of a set of stainless steel drawing instruments is awarded annually to a student in First year Engineering at Carleton University judged most worthy of the award by the Faculty of Engineering.
Donor: Wild of Canada Limited. Established 1960.

Chartered Institute of Secretaries Prize
A prize of $25 annually has been made available to the University for proficiency in the study of Commercial Law. Established 1963.
Donor: The Chartered Institute of Secretaries, Ottawa Chapter.

De Waan Foundation Prize on Arab Problems
Each year for a period of five years from the first year of award, the De Waan Foundation offers a prize for work of appropriate scholarly level by an upper class student on the problems of Arab countries. Annual value, $100. Students wishing to prepare for this award should first consult the Director of the School of Public Administration.
Donor: De Waan Foundation, 1960.

V. A. Ewing Memorial Prize
Value $100. Awarded annually, if merited, on the recommendation of the Department of Biology to a student entering his graduating year in Honours Biology who has shown outstanding application and promise in his laboratory work in experimental and descriptive Biology.
Donor: Anonymous.

Carswell Company Book Prize in Public Law
Value $30. Awarded annually to the student with the highest standing in a Public Law course.
Donor: The Carswell Company Limited. Established 1965.

Prize in English as a Medium of Communication
Value $25. Awarded annually, on the recommendation of the Department of English, as a book prize to a student in English who intends to enter the teaching profession and who has shown interest and competence in the effective use of English as a medium of communication.
Donors: Mr. and Mrs. Herman S. Roodman. Established 1965.

Wilfrid Eggleston Prize in Journalism
Value $150. Awarded to the undergraduate with the best record in the Second year Journalism degree program. This award is named in honour of Professor Emeritus Dr. Wilfrid Eggleston, former Director of the School of Journalism.
Donor: Anonymous. Established 1967.

Prize of the Ambassador of Switzerland to Canada
For excellence in the study of French and German, book prizes are offered annually by the Ambassador of Switzerland to Canada. Established 1953.

Prize of the Embassy of the Federal Republic of Germany
For excellence in the study of German, book prizes are offered annually by the Embassy of the Federal Republic of Germany in Canada. Established 1955.

Prize of the Embassy of Austria
For excellence in the study of German, a book prize is offered annually by the Austrian Embassy in Canada. Established 1960.

Spanish Embassy Prize
For excellence in the study of Spanish, a book prize is offered annually by the Spanish Embassy in Canada. Established 1960.

Prize of the Embassy of the Union of Soviet Socialist Republics
For excellence in the study of Russian, prizes are offered annually by the Embassy of the Union of Soviet Socialist Republics. Established 1963.

Prize of the Ambassador of the United States of America
A book prize is offered annually by the American Ambassador to Canada to a graduating student who has distinguished himself in the fields of United States history, economics, or political science.

Bursaries

Students who are eligible for Provincial Awards from the Province of Ontario or the Province of Quebec should first make application for these awards. Ontario secondary schools will supply applications for Ontario students entering university. In-course students should apply to the Awards Office. Completed forms should be sent to the Awards Officer, Carleton University.
Applications for student-aid grants from the Province of Quebec should be made direct to the Department of Education, Parliament Buildings, Quebec, before September 30.
Bursaries administered by Carleton University are awarded to students who have a sound academic standing, who show evidence of genuine financial need and who are not eligible to receive financial aid from the provinces of Ontario or Quebec.
One application only, available in the Awards Office, is required for bursaries which are administered by Carleton, and should be returned to the Awards Office by August 1.
Bursary recipients who withdraw before the completion of their year will be expected to refund their bursaries (or a portion thereof).

University General Bursary Fund
The fund is to provide bursaries in aid of students with satisfactory academic standing who, in the first or subsequent course-years, are in need of financial assistance. Established by the University in 1954.

Graduate Bursary Fund
The fund is to provide bursaries for graduate students with appropriate academic standing who are in need of financial assistance. Established by the University in 1958.

Ontario Student Awards Program
All students who are residents of Ontario and who satisfy the admission requirements of a Canadian university or an eligible post-secondary institution in Ontario may apply for an award under this program. To receive an award a student must establish a need for assistance and enrol in an eligible institution in a course other than Divinity in the year of award. An award under this program will be made to the extent of established need in a combination of a non-repayable grant and a Canada Student Loan. Application forms are available at secondary schools and all post-secondary eligible institutions, and from the Awards Office at Carleton.

Charles Ogilvy Ltd Bursary Fund
Value $1000. To provide bursaries for students with good academic standing and who are in need of financial assistance.
Donor: Charles Ogilvy Limited. Established 1960.

ATA Trucking Industry Educational Foundation, Bursary Fund
Value $1,200. To provide bursaries for First or Second year students who, due to extenuating circumstances, are deserving of financial assistance, and without such assistance would be unable to continue their studies.
Donor: Automotive Transport Association of Ontario (Inc.). Established 1959.

Altrusa Club of Ottawa Bursary
Value $100. Awarded to a deserving woman student proceeding into the third or graduating year at Carleton University. Preference to be given to a student enrolled in Science or Journalism where other qualifications are equal.
Donor: The Altrusa Club of Ottawa. Established 1962.

Ottawa Superfluity Shop Bursaries
An annual sum of approximately $180 is available to provide bursaries for veterans of World War I or World War II, or for the descendants of such veterans, who are students in good standing at Carleton University and in need of financial assistance. Endowed 1947.

Ottawa Citizens' War Services Committee Bursary
An annual sum of approximately $60 is available to assist veterans, their dependents or descendants, who are students in good standing at Carleton University and are in need of financial assistance. Endowed 1948.

Gyro Club Bursaries
Two bursaries of $250 each. Awarded annually to male students of promise who have completed at least one academic year at Carleton University, who have specific professional or vocational goals, and who, without financial assistance, could not continue their formal education.
Donor: Gyro Club of Ottawa. Endowed 1949.

Wild of Canada Limited Bursary
Value $250. Awarded annually to a student majoring in Biology, with good academic standing and who is in need of financial assistance.
Donor: Wild of Canada Limited. Established 1961.

The Mary C. Grant Bursary (Laurentian Chapter, I.O.D.E.)
Value $450. Awarded annually to a particularly able student entering Carleton University or proceeding from one year of course to another, and requiring financial assistance to complete his or her studies.
The bursary has been established in honour of Mary C. Grant.
Donor: The Laurentian Chapter, I.O.D.E. Established 1962.

J. P. Bickell Foundation Bursary Fund
Value to be announced. The Trustees of the J. P. Bickell Foundation have established bursaries in the Faculty of Science. An applicant must be taking a normal sequence of courses leading to a degree in Geology and must have competent academic standing. Carleton students may obtain full details of the Bursary from the Awards Office.
Donor: J. P. Bickell Foundation, Toronto. Established 1956.

Falkland Chapter (I.O.D.E.) Bursary
Value $100. Awarded to a deserving student from the Commonwealth progressing from one year of course to another in Carleton University.
Donor: Falkland Chapter, I.O.D.E. Established 1950.

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Knights of Pythias, Aurora Lodge No. 53 Bursary

Value $100. Awarded to a good student, progressing from one year of course to another, who needs financial assistance to continue his or her studies.
Donor: Knights of Pythias, Aurora Lodge No. 53. Established 1960.

Atkinson Charitable Foundation Bursary Fund

The sum of $5,600 is available to assist students of Carleton University. Terms of award are as follows:

1. In addition to scholastic merit and financial need, goal and promise will be considered in selecting recipients.

2. Candidates must be residents of Ontario.

3. An applicant must have completed at least one academic year and be enrolled as a full-time undergraduate in any course at Carleton University.

4. For one of the awards, preference will be given to candidates intending later to pursue studies in Theology.

Donor: The Atkinson Charitable Foundation. Offered for the first time in 1951, as an experiment in the provision of financial aid to students.

Maurice Frederick Carty Bursary

Value $300. Awarded annually to a student in course who would not otherwise be able to proceed without delay to a higher year within the University.
Donor: Mrs. E. G. Carty, in memory of her son, Maurice Frederick Carty. Established 1957.

Edward Godfrey Carty Bursary

Value $300. Awarded annually to a student in course, specifically in Engineering, who would not otherwise be able to proceed without delay to a higher year within the University.
Donor: Mrs. E. G. Carty, in memory of her husband, Edward Godfrey Carty. Established 1964.

Countess of Ashburnham Chapter (I.O.D.E.) Bursary

Value $100. Awarded annually to a student entering Carleton University, or already in course, who is in need of financial assistance to carry on full-time studies.
Donor: The Countess of Ashburnham Chapter I.O.D.E. Established 1959.

Arnhem Chapter (I.O.D.E.) Bursary

Value $100. Awarded to a student with satisfactory academic standing who in the judgment of the President of Carleton University is in need and deserving of financial assistance.
Donor: Arnhem Chapter I.O.D.E. Established 1955.

R. A. Beamish Bursary

Value approximately $250. Awarded annually to a student entering or progressing from one academic year to another who, without financial assistance, could not continue his or her formal education. To be eligible, an applicant must be a resident of one of the eleven eastern counties of Ontario (Renfrew, Frontenac, Lanark, Leeds, Carleton, Grenville, Russell, Dundas, Prescott, Glengarry, Stormont).
Donor: The R. A. Beamish Foundation. Endowed 1951.

South Ottawa Kiwanis Club Bursaries
(1) Value $250. Awarded annually to a student who has completed successfully at least one academic year at Carleton University and who, without financial assistance, could not continue university studies.
Donor: Kiwanis Club of South Ottawa. Established 1958.
(2) Value $250. Awarded annually to a student who has completed successfully at least one academic year at Carleton University and who, without financial assistance, could not continue university studies. Restricted to students from Ottawa and from areas outside the Capital in Carleton and Russell Counties.
Donor: Kiwanis Club of South Ottawa. Established 1958.

South Ottawa Kiwanis Club (Ladies Auxiliary) Bursary
Value $100. Awarded to a woman student who has completed one academic year at Carleton University, and who is in need of, and deserving of, assistance to continue studies as a full-time student.
Donor: Kiwanis Club of South Ottawa (Ladies Auxiliary). Established 1956.

Lions Club of Ottawa (South) Inc. Bursaries
Two bursaries valued at $200 each. Awarded annually to a student of good character, who exhibits proficiency and promise, and who has completed one academic year at the University, and who, without the benefit of financial assistance, would be unable to continue his or her chosen studies.
Donor: Lions Club of Ottawa (South) Inc. Established 1957.

James H. Rattray Memorial Bursaries
Value $200 each. Three bursaries for students in Science and Engineering, with certain areas of preference. (Candidates are invited to inquire about these from the Awards Office).
Donor: The late James H. Rattray, M.C. Established 1961.

Engineers' Wives Association Bursary
Value $400. Awarded annually to a deserving student enrolled in the Faculty of Engineering.
Donor: Engineers' Wives Association of Canada. Established 1959.

Caro Murray Bursary (Earnscliffe Chapter) I.O.D.E.
Value $250. Awarded annually to students entering or progressing from one year of course to another at Carleton University, who have sound academic standing and are in need of financial assistance.
Donor: Earnscliffe Chapter I.O.D.E. Established 1962 in honour of Mrs. G. Scott Murray.

Ottawa Poppy Welfare Fund University Award
The Ottawa Poppy Welfare Committee offers an amount of $1,500 to be used as awards to university entrance or to assist good students who are short of funds to continue in university. The amount of an award is $300 to any one student but this amount may be modified depending on financial circumstances.
Application forms are available at Poppy Fund Headquarters, Trafalgar House, or the Awards Office, Carleton University.
Donor: The Ottawa Welfare Poppy Fund Committee. Established 1956.

Philemon Wright Chapter (I.O.D.E.) Bursary
Value $75. Awarded annually to a student with satisfactory academic standing who is in need of financial assistance. Open only to residents of the Province of Quebec, with preference to those resident in the County of Hull and adjoining counties.
Donor: Philemon Wright Chapter, I.O.D.E. Established 1952.

Thorne, Gunn, Helliwell and Christenson Bursary
Value $150. Awarded annually to a deserving student in Commerce in need of financial assistance.
Donor: Thorne, Gunn, Helliwell and Christenson. Established 1960.

Phillips Bursary
Value approximately $200, the annual yield of a fund of $5,000 made available to Carleton University by Miss L. A. Phillips. The bursary is to be awarded each year to a student with good academic standing who is in need of financial assistance. Endowed 1962.

IBM-Thomas J. Watson Memorial Bursaries
Value $1,500 annually. To provide bursaries to undergraduates in any year of any faculty who are of good academic standing and in need of financial assistance.
Donor: International Business Machines Company Limited. Established 1963.

Corporation House Limited Bursary
Value $250. To be awarded annually to a good student in need of financial assistance, who is, in addition, a son or daughter of a parent employed in the Civil Service of Canada, or in a Federal Corporation or Agency, or serving in the Armed Forces of Canada.
Donor: Corporation House Limited. Established 1962.

Honourable Cairine Wilson Bursary
Value $200. Awarded annually to a good student entering Carleton University or proceeding from one year of course to another and requiring financial assistance to complete his or her studies. The bursary has been made possible by a bequest of the Honourable Cairine Wilson, first woman member of the Canadian Senate. Endowed 1962.

M. Loeb Limited — IGA Bursaries
Value $2,500. To provide ten bursaries of $250 each, to be awarded annually to good students either entering Carleton University or proceeding from one year of course to another who are in need of financial assistance.
Donor: M. Loeb Limited. Established 1962.

Beta Sigma Phi Sorority Bursary
Value $250. Awarded to a deserving woman student entering Carleton University from an Ottawa Collegiate or High School. This bursary may be a continuing one for three years, provided the recipient maintains satisfactory academic standing.
Donor: The City Council of Beta Sigma Phi Sorority. Established 1964.

Hydro-Electric Power Commission of Ontario Bursary
Value $500. Awarded annually to a student in need of financial assistance and who is entering the second year of the Honours course in Physics or Mathematics; or the second year of Engineering or Commerce.
Donor: The Hydro-Electric Power Commission of Ontario. Established 1964.

Nathan Braham Bursary

Value $200-$250. Awarded annually to an entering or returning student, with superior academic standing who is in need of financial assistance. The bursary has been made possible by a bequest of Mr. Nathan Braham. Endowed 1964.

Steel Company of Canada, Limited Bursary

Value $500 annually. Awarded to a good entering student who has completed his or her final year's work for university entrance in one school year. This Bursary may be a continuing one for up to four years, provided that satisfactory academic standing is maintained.
Donor: The Steel Company of Canada, Limited. Established 1965.

National Printers Limited Bursary

Value $250. Awarded annually to an undergraduate student who has completed at least one academic year at Carleton University, and who is in need of financial assistance.
Donor: National Printers Limited, Ottawa. Established 1965.

Army, Navy and Air Force Veterans Ottawa Unit Bursaries

Two bursaries valued at $150 each. Awarded annually to students entering or progressing from one year of course to another in Carleton University, who have satisfactory academic standing and are in need of financial assistance. Preference will be given to veterans or the dependents of veterans.
Donor: Army, Navy and Air Force Veterans in Canada, Ottawa Unit 352. Established 1953 and 1964.

Ormond M. Stitt Bursary Fund

To provide bursaries for deserving students in need of financial assistance. The fund has been made possible by a bequest of the late Miss Edith May Stitt, in memory of her brother, Ormond M. Stitt. Endowed 1966.

Friends of Carleton Bursary Fund

A sum to provide bursaries for deserving students in need of financial assistance. This fund has been made possible by contributions from the Friends of Carleton University. Established 1967.

Doran Bursary in Engineering

Value $500. Awarded annually to deserving students enrolled in the Faculty of Engineering, and progressing from second to third year.
Donor: W. H. Doran Construction Company Limited. Established 1967.

Abraham and Mary Shaffer Bursary

Value $500. Awarded annually to a good student entering Carleton University or proceeding from one year of course to another, and requiring financial assistance to complete his or her studies.
Donor: The late Abraham Shaffer. Established 1967.

Children of War Dead (Education Assistance) Act

This act provides fees and monthly allowances for children of veterans whose deaths were attributable to military service. Enquiries should be directed to the nearest District Office of the Department of Veterans Affairs.

Donald William Buchanan Bursary
Value $250. Awarded annually to a student entering or progressing from one academic year to another, and who is in need of, and deserving of, assistance to continue studies as a full-time student.
Donor: The late Donald William Buchanan. Endowed 1967.

Litton Systems (Canada) Limited Bursaries
Two bursaries valued at $150. each. Awarded annually to students with good academic standing, enrolled in the Faculty of Engineering, and who are in need of financial assistance. Preference will be given to those students who plan to major in Electrical or Mechanical Engineering.
Donor: Litton Systems (Canada) Limited. Established 1967.

J. Lansing Rudd Bursary
Value $225. Awarded annually to a good student progressing from one year of course to another who needs financial assistance to continue his or her studies.
Donor: The late J. Lansing Rudd. Endowed 1967.

Loan Funds

The university administers several loan funds which are available on a short and long term basis to students in need of financial aid.
Loans made from funds held in trust by the University are repayable after termination of undergraduate studies, and bear interest at the rate of 4% per annum beginning January 1 following the termination of studies. To be eligible for a loan, a student must have a satisfactory academic record and show need of financial assistance. Applicants for loans should contact the Awards Office.

General Loan Fund
Unrestricted. In addition to loans made on the general basis outlined above, one-month loans of up to $35 may be made from this fund. Applications will be received by the Awards Office. Founded by Kenneth Brewster.
Other donors: Women of Rotary, Office Staff of Carleton University, F. J. G. Cunningham, Katherine J. Milliken, Mrs. J. S. MacLean, the late Mrs. Lila Wilson, and several anonymous donors. Established 1948.

John W. Parker Loan Fund
To assist students in need of, and deserving of, financial assistance, who appear willing and able to repay their loans. Undergraduates will normally be expected to have completed at least one year at Carleton University. Applicants must present a passing grade and show evidence in their academic record of likelihood of graduation. Under normal circumstances, the maximum loan to a student shall be $500 a year, but loans up to $1,500 a year to students with dependents may be made if merited.
Donor: The late Mrs. John W. Parker. Established 1955.

Canada Student Loans Plan
Students who do not qualify to seek assistance under the Ontario Student Awards Program may nevertheless apply for a Canada Student Loan provided that they meet certain conditions of eligibility. These are set out, together with other details of the Plan, in a brochure issued by the Government of Canada that may be obtained at all eligible post-secondary institutions and secondary schools in Ontario and from the Awards Office at Carleton. The application form for the Ontario Student Awards Program is also used for the Canada Student Loans Plan.

Journalism Loan Fund
Reserved for students in the course leading to the degree of Bachelor of Journalism.
Founded by The Canadian Women's Press Club, Ottawa Branch.
Other donors: Rielle Thomson, Kenneth Wilson, Blair Fraser, Canadian Pulp and
Paper Association, Bruce Hutchison, F. P. Galbraith, Serrell Hillman, T. W. L.
MacDermot. Established 1948.

Commerce Loan Fund
Preference is given to students in the course leading to the degree of Bachelor of
Commerce. Founded in 1949 by the Class of Commerce '49.
Other donors: Class of Commerce '50.

Laurentian Chapter (I.O.D.E.) Small Loan Fund
The sum of $200 has been made available to assist in providing small emergency
short-term loans to students in need.
Donor: Laurentian Chapter I.O.D.E. Established 1950; revised 1959.

English-Speaking Union (Ottawa Branch) Small Loan Fund
The sum of $400 has been made available to assist in providing small emergency
short-term loans to students in need. Preference is given to students from abroad who
are enrolled as full-time students at Carleton University.
Donor: The English-Speaking Union (Ottawa Branch). Established 1962.

Royal Commonwealth Society (Ottawa Branch) Small Loan Fund
The sum of $150 has been made available to assist in providing small emergency
short-term loans to students in need. Preference is given to Commonwealth students
from abroad who are enrolled as full-time students at Carleton University.
Donor: The Royal Commonwealth Society (Ottawa Branch). Established 1964.

*Further information regarding existing sources of scholarships, prizes, bursaries and
loans may be had from the Awards Office.*

FACULTY OF ARTS
Schedule of Day Division Courses
Summer Sessions 1968 – 1971

	1968	1969	1970	1971
Art	100	100	100	100
Classics {Greek}{Latin}	15 100	15 100	15 100	15 100
English	100 232 236 348 362 One or two other courses	338 361 382 One or two other courses	300 342 367 One or two other courses	232 303 382 One or two other courses
French	1 10 100 101 201* 202* 225 470 570 (2)	1 10 100 201* 202* 210 301* 302* (2)	1 10 100 201* 202* 215 301* 302* (2)	1 10 100 101 102 201* 202* 203* 220 301*
Geography	330	At least one course 100–300 level	At least one course 100–300 level	At least one course 100–300 level
German	15 100 490*	15 100 One other	15 100 One other	15 100 One other
History	215 230 240 385	One of: 112 115 One of: 235 240 One of: 353 358 370	One of: 235 240 358 370 One of: 257 353 One of: 260 316 318 365 380	

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	1968	1969	1970	1971
Italian	— (7)	— (7)	— (7)	— (7)
Journalism	210			
Philosophy	100 210	100 One course 200–300 level	100 One course 200–300 level	100 One course 200–300 level
Political Science	100 230	100 230 260	100 210 333	100 230 260
Psychology	100 220* 221* 250 340 360	One of: 210 250 260 270 330 335 340	One of: 210 250 260 270 330 335 340	One of: 210 250 260 270 330 335 340
Russian	15 100	15 100	15 100	15 100
Sociology	100 230 240 245	100 At least one at 200 level and one at 300 level	100 At least one at 200 level and one at 300 level	100 At least one at 200 level and one at 300 level
Spanish	15 100 301* (2) 302* 490	15 100 210 (2) 301* 302*	15 100 210 (2) 301* 302*	15 100 210 (2) 301* 302*

Schedule of Evening Division Courses in the Faculties of Arts and Science
Winter and Summer Sessions, 1968–1972

	Summer 1968	Winter 1968–69	Summer 1969	Winter 1969–70	Summer 1970	Winter 1970–71	Summer 1971	Winter 1971–72
Accounting	100	100 340 200	100	100 325* 200 326* 340	100	100 340 200	100	
Art	—	100 230 250 330	—	100 Two or more at 200 level One or more at 300 level	—	100 Two or more at 200 level One or more at 300 level	—	100 Two or more at 200 level One or more at 300 level
Biology	215 (1)	100 205	100 210 (1)	100	205 (1)	215	100 (1)	100 210
Chemistry	—	100	—	250	—	220	210	210
Classics (Classical Civilization)	200	201 330	201	200 320	200	201 330	201	200 320
Economics	100 210 200 225 Two courses 200–400 level	100 Two of: 200 225 210 or 220 325 Two or three courses 300–400 level	100 225 200 or 325 210 Two courses 200–400 level	100 Two of: 200 225 210 or 220 325 Two or three courses 300–400 level	100 225 200 or 325 210 Two courses 200–400 level	100 Two of: 200 225 210 or 220 325 Two or three courses 300–400 level	100 225 200 or 325 210	100 Two of: 200 225 210 or 220 325 Two or three courses 300–400 level
English	10 Two of: 100 102 101 Two courses 200–400 level	10 162 100 232 102 Two or three courses 200–400 level	10 Two of: 100 102 101 352 Two courses 200–400 level	10 102 100 162 Two or three courses 200–400 level	10 Two of: 100 162 101 232 102 Two courses 200–400 level	10 162 100 352 102 Two or three courses 200–400 level	10 Two of: 100 102 101 162 Two courses 200–400 level	10 162 100 232 102 Two or three courses 200–400 level

	Summer 1968	Winter 1968-69	Summer 1969	Winter 1969-70	Summer 1970	Winter 1970-71	Summer 1971	Winter 1971-72
French	1 201* 10 202 100 210 101 330 102 (2)	1 202* 10 203* 100 215 101 301* 102 Four 400 or 500 level	1 202* 10 220 100 301* 201* 302* (2)	1 202* 10 225 100 301* 201* 302* One 300 level and one 400 or 500 level	1 202* 10 230 100 301* 201* 302* (2)	1 202* 10 210 100 301* 201* 302* One 300 level and one 400 or 500 level	1 201* 10 202* 100 203* 101 215 301* (2)	1 202* 10 210 100 301* 201* 302* One 300 level and one 400 or 500 level
Geography	—	230 345 430	One of: 230 250 315	One of: 250 340 420	One of: 340 420	Earth Science 100 112* Geography 220 360		
Geology	100 (1)	100 484* 505	100 (1)	100 484*	100 (1)	100 484* 505	100 (1)	100 484*
German	15 100	15 100 (3) Two 200, 300 or 400 level courses	15 100 One 200 or 300 level course	15 100 (3) Two 200, 300 or 400 level courses	15 100 One 200 or 300 level course	15 100 (3) Two 200, 300 or 400 level courses	15 100 One 200 or 300 level course	15 100 (3) Two 200, 300 or 400 level courses
History	112	112 360 201 365 214 380 230	201 257	115 325 200 380 215 385	200 230 350	112 240 201 260 225 350		
Italian	—	15	— (7)	15 100	— (7)	15 100 One 200 level course	— (7)	15 100 One or two 200 or 300 level courses
Journalism	220		220		220		220	

	Summer 1968	Winter 1968–69	Summer 1969	Winter 1969–70	Summer 1970	Winter 1970–71	Summer 1971	Winter 1971–72
Mathematics	10 245* / 11 257* / 100 310 / 101 325* / 205* 326* / 215* 360 / (4)	10 245* / 11 250 / 100 257* / 101 325* / 205* 326* / 215* 360	10 205* / 11 215* / 100 245* / 101 257* / (4)	10 245* / 11 250 / 100 257* / 101 310 / 205* 341 / 215*	10 205* / 11 215* / 100 245* / 101 257* / (4)	10 245* / 11 250 / 100 257* / 101 307* / 205* 308* / 215*	10 205* / 11 215* / 100 245* / 101 257* / (4)	10 245* / 11 250 / 100 257* / 101 325* / 205* 326* / 215* 360
Philosophy	100 / 215	100 / (5)	100 / At least one course 200–300 level	100 / (5)	100 / At least one course 200–300 level	100 / (5)	100 / At least one course 200–300 level	100 / (5)
Physics	100 317* / 476? (6)	100 211* / 242*	10 317* / 476? (6)	10 222* / 231*	100 317* / 476? (6)	100 211* / 242*	100 317* / 476? (6)	10 222* / 231*
Political Science	100 400 / 260 460 / 340	100 320 / 230 340 / 260 400 / 300	100 230 / 210 340 / 220 400	100 340 / 230 400 / 260 460 / 300 / 310	100 260 / 210 320 / 230 340	100 310 / 230 340 / 260 400 / 270 460 / 300	100 270 / 220 340 / 230 360	100 310 / 230 340 / 260 400 / 300 460
Psychology	205 / 210 / 270 / 320	100 340 / Two of: / 210 330 / 250 335 / 260 340 / 310	100 / 205 / 305 / Two of: / 210 330 / 250 335 / 260 340 / 270	100 / Two of: / 210 330 / 250 335 / 260 340 / 270	100 300 / 205 305 / Two of: / 210 330 / 250 335 / 260 340 / 270	100 / 300 / Two of: / 210 330 / 250 335 / 260 340 / 270	100 / 205 / 210 / 260	100 / One of: / 210 300 / 250 330 / 260 335 / 270 340
Public Law	—	251 451 / 350 452 / 450 455	—	251 451 / 350 452 / 450 455	—	251 451 / 350 452 / 450 455	—	251 451 / 350 452 / 450 455

	Summer 1968	Winter 1968–69	Summer 1969	Winter 1969–70	Summer 1970	Winter 1970–71	Summer 1971	Winter 1971–72
Religion	100 120	100 230 240	100	100 240	100 120	100 240	100	100 240
Russian	15	15 20 100 (3) Three 200, 300 or 400 level	15 100 One 200 or 300 level	15 100, 20 110 (3) Three 200, 300 or 400 level	15 100 One 200 or 300 level	15 100, 20 110 (3) Three 200, 300 or 400 level	15 100 One 200 or 300 level	15 100, 20 110 (3) Three 200, 300 or 400 level
Sociology and Anthropology	100 200 300	100 200, 101 300, 102 305 Two of: 225 320, 230 345, 240 350, 250 360, 255	100 At least one 200 or 300 level	100 300, 101 301, 102 305, 200 Two of: 225 320, 230 345, 240 350, 250 360, 255	100 At least one 200 or 300 level	100 300, 101 301, 102 305, 200 Two of: 225 320, 230 345, 240 350, 250 360, 255	100 At least one 200 or 300 level	100 300, 101 301, 102 305, 200 Two of: 225 320, 230 345, 240 350, 250 360, 255
Spanish	15 202*, 100 210, 201* (2)	15 202*, 100 210, 201* One 300 level One 400 level	15 202*, 100 210, 201* (2)	15 202*, 100 210, 201* One or more 300 level One 400 and One 500 level	15 202*, 100 210, 201* (2)	15 202*, 100 210, 201* One or more 300 level One 400 and One 500 level	15 202*, 100 210, 201* (2)	15 202*, 100 210, 201* One or more 300 level One 400 and One 500 level

Notes: (1) Summer courses offered by the Departments of Biology and Geology are in the Day Division only.
(2) Other summer courses offered by the Departments of French and Spanish at the 300-400-500-level may be in Day *or* Evening Division.
(3) At least one literature course and one composition-conversation course are given each year in the winter Evening Division (200-400 level).
(4) Summer courses offered by the Departments of Mathematics and Physics are in the Evening Division only. Mathematics 70.200 and 70.210 may be offered in the Summer Session.
(5) It is not possible for a part-time student in the Evening Division to major in Philosophy.
(6) Physics 75.317* and 75.476 will be offered in the Summer Session each year only if required by Physics Qualifying year graduates or Third and Fourth year undergraduates.
(7) Italian courses will be offered in the Summer Session as the need arises.

1968

January
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

February
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March
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31						

April
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May
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June
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July
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August
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25	26	27	28	29	30	31

September
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October
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November
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December
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1969

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July
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August
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24	25	26	27	28	29	30
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September
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28	29	30				

October
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November
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December
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14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Administrative Offices

President's Office
President   Davidson Dunton, LL.D., D.Sc.
Personal Assistant to the
   President   Eileen Cox (Mrs. W. H.), B.A.

Planning
Director of Planning   G. Ross Love, M.A., Ph.D.

Registrar's Office
Registrar   To be appointed
Assistant Registrar   Elizabeth M. Buckley, B.A.
Assistant to the Registrar Doris M. Tyner, B.A.
Registrar,
   St. Patrick's College   John B. Zachary, O.M.I., M.Sc.
Admissions and Records
   Officer, School of
   Social Work   Janice Latimer, B.A.

Library
University Librarian   Hilda G. Gifford, B.A., B.L.S.
Chief of Technical Services Jean Carter (Mrs. R. H.), B.A., B.L.S.
Chief Cataloguer   Susan L. Jackson, B.A., B.L.S.
Chief Reference Librarian Verna Z. Wilmeth (Mrs. R.), B.A., M.A.L.S.
Chief Circulation Assistant Audrey G. Turner
Librarian,
   St. Patrick's College   Francis B. Wallis, O.M.I., B.A., B.L.S.

*Computing and Data
Processing Centre*
Director   John D. Buck, M.Sc.

Student Affairs Office
Dean of Students   To be appointed
Administrative Assistant
   to the Dean   Richard A. Brown, B.A.
Acting Dean of Women,
   St. Patrick's College   Suzanne Veit, B.Soc.Sc.
Overseas Students' Adviser André Elbaz, L. ès L.
Awards Officer   Jean A. Loates (Mrs. A. T.), B.A.
Housing and
   Placement Officer   Irene Tremblay (Mrs. N. J.)
High School
   Liaison Officer   J. L. Sevigny, B.A.
Director of Athletics   Keith N. Harris, B.A., B.P.H.E.
Assistant Directors of
   Athletics
   (Program)   Kenneth I. McCuaig, B.A., B.P.E.
   (Women)   Sandra Knox (Mrs. D. F.), B.A. (P.E.)
Special Athletic Events   F. J. Corkran
Director of Athletics,
   St. Patrick's College   J. Bryan Kealey, B.Comm., B.P.E.

*Counselling and
Health Services*
Director   Norman D. Fenn, B.S., M.ED.
University Physician   Jean M. Davey, M.D.
Psychiatrist   Brian O'Brien, B.A., M.B., B.C.L., D.P.H., R.C.P.S.
Nurse   Kathleen Bayley, P.H.N.

Residences
Provost of Residences   Munro Beattie, A.M., Ph.D.
Senior Residents
   (Renfrew)   Mary-Louise Funke, B.A.
   (Lanark)   Munro Beattie, A.M., Ph.D.
   (Grenville)   Norman D. Fenn, B.S., M.ED.
   (Russell)   William Fraser, B.A.
Administrative Officer   J. F. Irvine

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Development Office
Development Officer   Michael D. Roberts
Assistant Development
     Officer   S. B. Fraser
Assistant to the
     Development Officer   Donna DuBreuil (Mrs. G. D.)

Information Office
Acting Information
     Officer   Guy R. Simser, B.A., B.J.
Information Assistant   Donald M. Pattison, B.A.
Publications Officer   Caroline Midgley (Mrs. A.), B.A.
Information Writer   Christopher G. Jermyn, B.A., B.J.
Alumni Executive
     Secretary   Brian A. Blevins, B.A., B.J.

Bursar's Office
Bursar   F. J. Turner, B.Com., M.A., F.C.I.S.
Secretary of the
     Board of Governors   D. C. McEown, B.A., Dip.B.A.

     Finance Officers
     Controller   A. B. Larose, B.Com., C.A.
     Assistant Controller   R. Gerald Jenkins, C.A.
     Assistant Controller   J. K. Kettles, B.Com., C.A.
     Purchasing Agent   B. W. Dollin
     Accountant   R. C. Lahey, B.Com.
     Finance Officer,
         St. Patrick's College   Muriel Cahill

Administrative Officers
     Personnel   Ruth Deakin (Mrs. H. L.)
     General Services   D. H. Lauber
     Instructional Aids
         Officer   Thomas Farley, M.A.

     Bookstore Manager   F. Beverley Moore (Mrs. R. D.)

Physical Plant Officers
Director   J. E. Whenham, B.Arch., M.Sc. (C.E.), M.R.A.I.C.,
         P.Eng.
Security Officer   N. W. Smith

     *Planning and
     Construction*
     Projects Manager   J. B. Findley, B.Sc., P.Eng.
     Mechanical Engineer   J. F. Townsend, B.A.Sc., P.Eng.
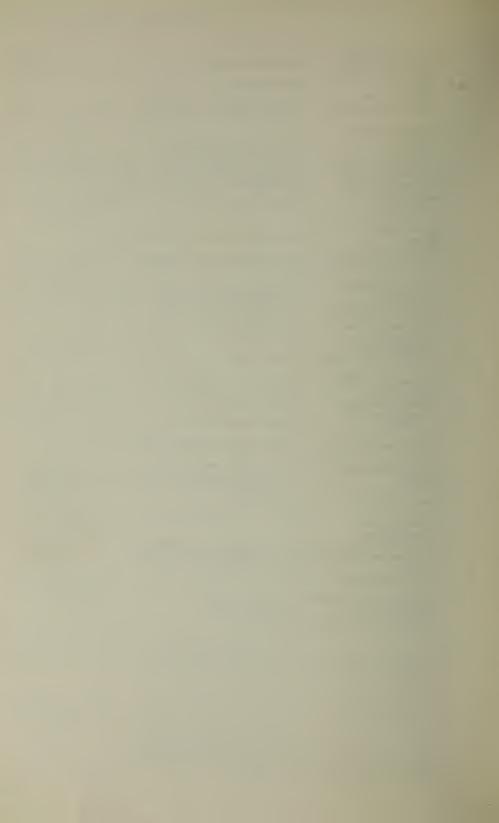   Planner   W. J. A. Black
     Interior Designer   J. Cook, B.I.D.

     Buildings and Grounds
     Superintendent   P. deWolf, P.Eng.
     Assistant Superintendent   E. Robinson

Registrar's Office Hours

Labour Day to June 28

Monday to Friday	9.00 a.m. to 12.15 p.m.
	1.15 p.m. to 5.00 p.m.
Monday to Thursday	7.00 p.m. to 9.00 p.m.

July 1 to Labour Day

Monday to Friday	8.30 a.m. to 12.00 noon
	1.00 p.m. to 4.30 p.m.
Monday to Thursday	6.30 p.m. to 8.30 p.m.

Business Office Hours

Labour Day to June 28

Monday to Friday	9.00 a.m. to 5.00 p.m.
Monday to Thursday	7.00 p.m. to 9.00 p.m.

July 1 to Labour Day

Monday to Friday	8.30 a.m. to 4.30 p.m.
Monday and Thursdays only˙	6.30 p.m. to 8.30 p.m.

Library Hours

Summer Session
May-June

Monday to Thursday	9.00 a.m. to 10.15 p.m.
	10.15 p.m. to 11.15 p.m. Study Hall
Friday	9.00 a.m. to 5.00 p.m.
Saturday	9.00 a.m. to 12.30 p.m.

July-August

Monday to Thursday	8.30 a.m. to 10.15 p.m.
	10.15 p.m. to 11.15 p.m. Study Hall
Friday	8.30 a.m. to 4.30 p.m.
	4.30 p.m. to 11.15 p.m. Study Hall
Saturday	8.30 a.m. to 12.30 p.m.
	12.30 p.m. to 11.00 p.m. Study Hall
Sunday	1.00 p.m. to 11.00 p.m. Study Hall

Winter Session

Monday to Friday	8.30 a.m. to 10.15 p.m.
	10.15 p.m. to 12.00 midnight. Study Hall
Saturday	9.45 a.m. to 4.45 p.m.
	4.45 p.m. to 12.00 midnight. Study Hall
Sunday	10.00 a.m. to 12.00 midnight. Study Hall

When classes are not in session, hours vary and are posted at the entrance.

Bookstore Hours

Labour Day to May (End of Final Examinations)

Monday to Friday	9.00 a.m. to 4.45 p.m.
	7.00 p.m. to 9.00 p.m.